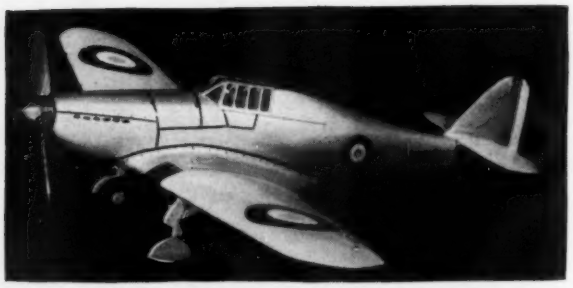
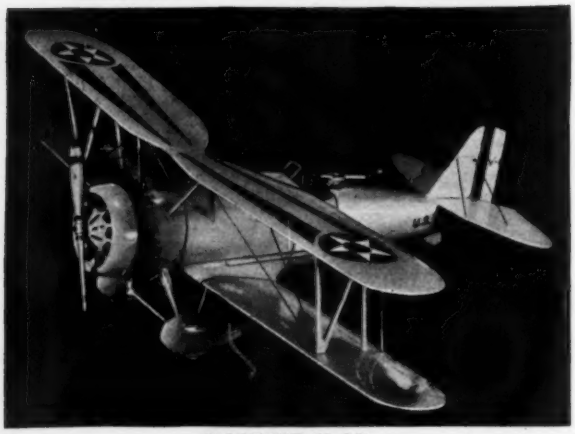
MODEL AIRPLANE NEWS

OCTOBER
1936
20c

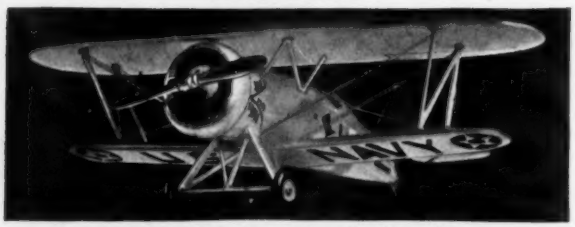
The Blackburn F.7-30 Fighter



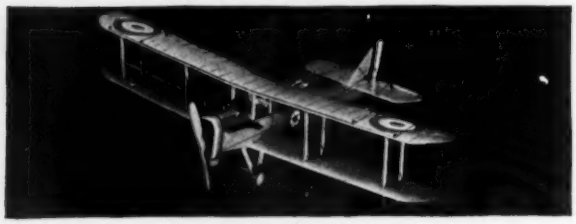
HAWKER SINGLE-SEATER FIGHTER



VOUGHT V-65



BOEING F4B-4 (re-designed)



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See Note

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See Note

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See Note

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See Note

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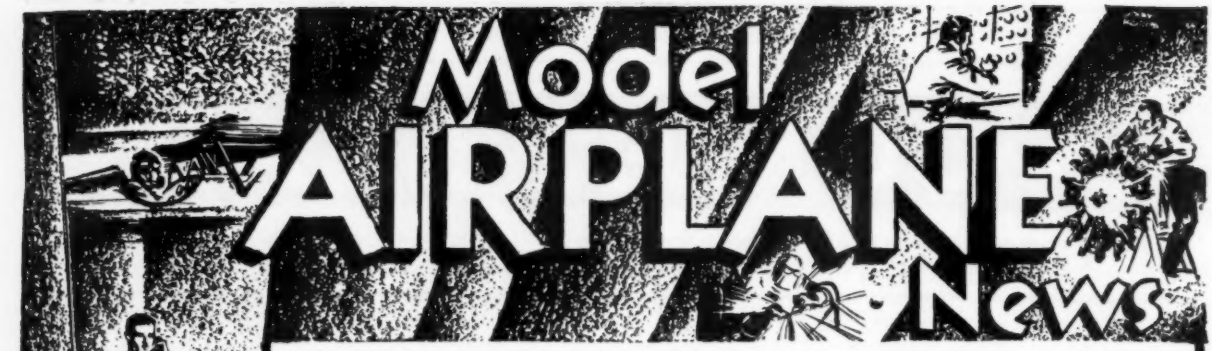

8th YEAR OF PUBLICATION

VOL. XV *No. 3*

Edited by Charles Hampson Grant

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In Our Next Issue

The latest authentic information about developments in British aviation is given in **Will England Dominate the Air Lanes?** by Alonzo Staples.

William Ying shows how you can build and fly a fuselage model that flew out of sight after flying 41 min. and 19 sec., in **Building a World Record Fuselage Model.**

Frank Tlush 1936 National Contest gas model winner gives important hints about model gas engineers in **How to Put "Revs" into Your "Gas" Motor.**

How to Build and Fly the Potez 37R-2 by Nick Limber shows you how to create a flying scale model of exceptional performance and unique appearance.

A World Record Hydro, by Victor Fritz gives the indoor fans something to think about.

Also there are plans which show how you can turn your KG gas job into a cabin model.

The results of the first **Air Ways Design Contest** and the winning plans will appear.

How to Design Your Fuselage Model, Part No. 2, by Charles H. Grant, gives information on design that will prove useful to both rubber power and gas power fans. Fuselage model plans are also given.

Other articles which will give you a wealth of pleasure and information are: **Frontiers of Aviation, Air Ways, "Gas Lines", Aviation Advisory Board,** as well as three view drawings of famous planes.

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1/8x3/8	.06	1/2x3/4	.15
1/8x1/2	.07	1/8x1	.18
3/16x3/16	.05	3/8x3/4	.15
3/16x1/2	.08	3/8x1	.20
1/4x1/4	.06	1x1	.25
1/4x3/8	.08		

SHEET BALSA

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1/32x3	.15	3/16x3	.25
1/16x2	.12	1/4x2	.20
1/16x3	.18	1/4x3	.25
1/8x2	.15	1/8x2	.25
1/8x3	.20	1/8x3	.35

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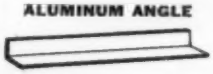

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A pursuit squadron taking off to attack bombers reported by an observation post. (Off. Photo U.S. Army Air Corps)

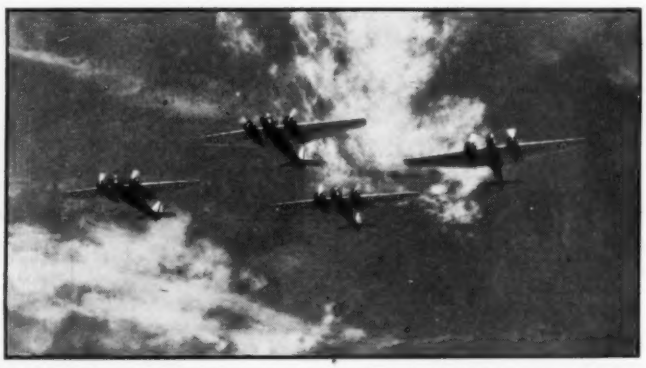
Will the Bomber Replace the Pursuit Plane?

The Vital Facts That Influence This Puzzling Question and to What They May Lead

By H. LATANE LEWIS II

NOT so long ago the pursuit plane was the backbone of our air corps. It held undisputed supremacy of the air and could fly circles around the then lumbering bomber. But what a change has taken place! The bomber can no longer be placed in the "slow freight" class. Instead, it has forced the pursuit plane to take a back seat. The little fighters can't even catch up with some of the latest multi-motored bombardment ships developed for the army.

Until recently designers have been able to maintain the speed of the pursuit at approximately 50% above that of heavy bombardment. In the last year, due to the unusually effective design of multi-engined bombers, taken in conjunction with the ability to reduce the head resistance of the motors in comparison with their horsepower, the speed of the bombardment airplane has rapidly overhauled that of the pursuit plane.



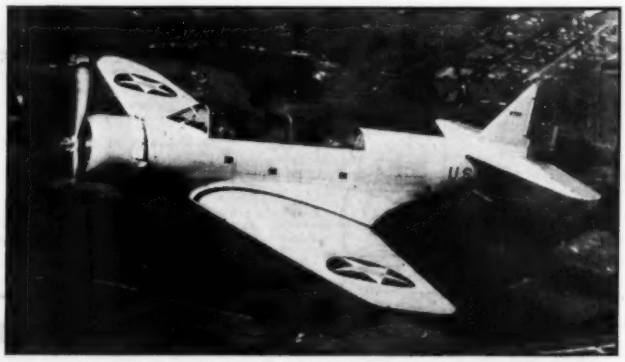
A formation of 220 m.p.h. Martin Bombers. (Off. Photo U.S. Army Air Corps)

What is the result? Air strategists are now scratching their heads to evolve new tactics to keep the bomber in its proper place, and many are beginning to feel dubious as to the future of pursuit aviation.

The army is conducting tests which may revolutionize the whole science of air fighting in this country. The results of the tests will of course be reserved as military secrets, but one won't have to be "in the know" in the air corps to see what happens if pursuit is decided to be of second-rate importance.

The tests are of two kinds. At Wright Field a contest for bigger and better bombers is under way, and the most powerful offensive aerial weapons the world has ever seen are now undergoing exhaustive trials by the Material Division. These ships will be so bristling with guns that they will have practically no blind angles and it is believed that if foreign pursuit planes should be fast enough to overtake them, it would take almost a whole flight of the pursuiters to down one bomber.

At March Field, California, the air corps has been carrying on a series of "upper air laboratory tests" to determine the efficiency of modern pursuit planes against the new high-speed bombers.



One of our latest light bombers; the Douglas TBD-1 (Off. Photo U.S. Navy)

The tests have involved actual operations in flight of P-26A pursuit planes attacking Martin B-12 bombers under a wide variety of conditions. All airplanes carried full military loads, and the pursuit planes were equipped either with .30 or .50 caliber synchronized machine-guns, or small cannon, and each carried from 15 to 40 bombs weighing from 5 to 10 pounds each.

The problems being flown are what is known as the "interception" type; that is defense against enemy bombers invading our shores. The pursuit pilots remain on "alert duty" and when observation posts at advance points report that an enemy formation has passed over, flying in a given direction, the pursuit squadrons climb up to intercept them and attempt to shoot them down. If there is sufficient time, of course the pursuiters may, by attaining a superior altitude, be able to dive upon the big ships and in this way gain an advantage.

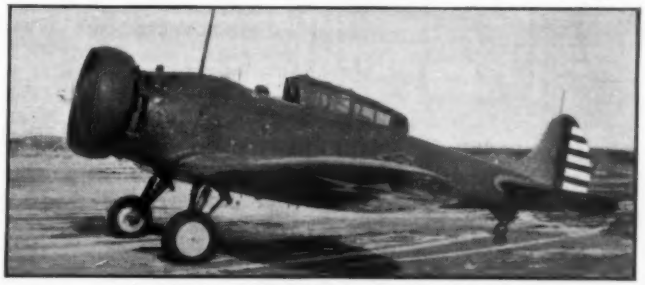
But all through these tests it has been evident that in future wars, bombardment will be able to operate under conditions so unfavorable to pursuit, that even if speeds were equal, pursuits would be at a decided disadvantage. Bombers can pick bad weather that would make it almost impossible for fighters to locate and intercept them, yet the bombers can locate their target as it is usually fixed. Radio navigation, which is an important part of the equipment of the new bombers, makes it possible to find a fixed point on the ground with uncanny accuracy when visibility is obscured.

"A revolution of fighter design and tactics may be the answer to the successful combatting in the air of bombardment operations," states one member of the air corps.

Keystone Bombers about to attack a squadron of cruisers shown above, left

A P-26A pursuit formation 95th squadron, World War outfit traveling at 230 m.p.h.

The Consolidated P-30 2-seater pursuit. (Off. Photo U.S. Army)



A fast Boeing YP-29 single seat pursuit ship

"In the matter of design, this may take the form of a multi-engined fighter of somewhat similar characteristics of the bomber and of only slightly superior speed. This type of fighter would naturally involve a superiority of fire power, perhaps both in the matter of number of guns and also a greater range for the guns. With such conditions obtained for the fighter airplane, the tactics may then be modified to give the greatest advantage to this superior fire power. It is probable that such tactics may take the form of a 'stern chase' and a 'running fight' such as are employed in the tactics of naval vessels."

Some authorities are now advocating an air force of one type of plane only, letting it perform all of the functions of military flying. General Douhet, recognized as one of the world's foremost aerial strategists and originator of the famous Douhet doctrine, states that for a country to provide classes of aircraft other than bombers is to detract from the main effort. The general is now in Africa studying the situation between Italy and Ethiopia.

Fighter aircraft cannot successfully stop the attacks of bombardment aircraft against either sea or land objectives, Douhet states emphatically. And when Douhet speaks, the world of military aviation pauses and lends an ear, for his prophecies have a way of being fulfilled right to the letter.

"This theory appears to be coming more and more into general acceptance," it is stated at the War Department. "The tremendous difficulties presented in obtaining information of a bombardment formation's approach are intensified when such formation can approach from any point of the compass, and at almost any altitude within the capacity of the ceiling of the aircraft, and at a speed which, if it has not already reached 200 miles an hour, will soon do so.

"Tacticians are fairly well agreed that successful results against the bombardment airplanes themselves will probably have to be secured by attack against these airplanes *on the ground*, when they are refueling and re-arming and by destroying the facilities of their bases." That is something new in air fighting—carrying the battle to the enemy's airdrome and catching him in his lair, rather than fighting it out in flight. The War Department spokesman also states that, *to a lesser extent*, the invading bombers may be attacked in the air, but he points out that such attack will probably have to be made after the bombers have done their damage and returning to their base, the fighter aircraft placing themselves across the path of the hostile bombardment.

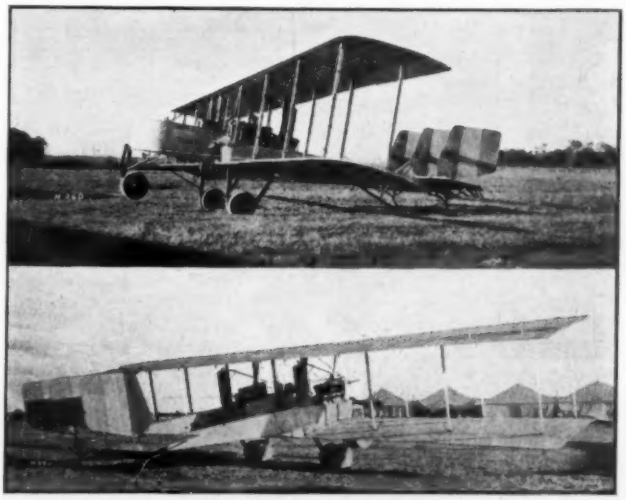
Many air people believe that the long range bomber is rapidly pushing the naval aircraft carrier into a position of relative unimportance. The reason for this contention is that our National Defense Act states that the military policy of the United States shall simply be that of defense. Applied to the flying forces, this means that our airplanes will only be called upon to defend us against attack.

Let us take a look at the plans of the GHQ Air Force and see what the relation is between the long-distance bombers and the seagoing aircraft carriers.

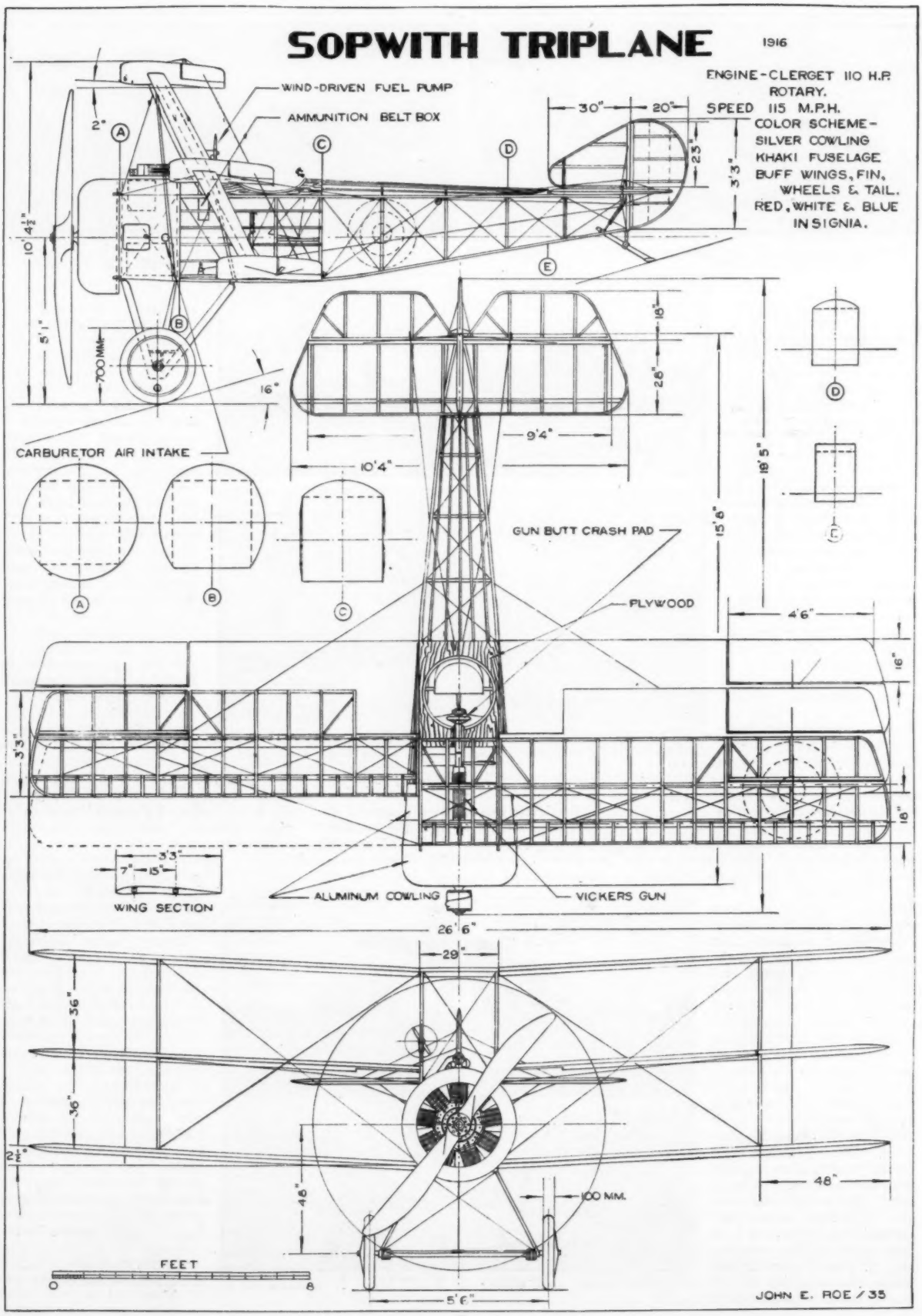
"From dispersed airdromes close up to our land frontier," it is stated, "our airplanes can reach the enemy planes on the ground at the base from which they make their final take-off to attack remunerative targets at considerable distances within the interior of our country. To destroy airplanes on the ground does not require heavy bombs. Light bombers with the necessary range, (which can be half, or less than half of the enemy bombers), may be reasonably expected to stop enemy air attacks by destroying the hostile planes on the ground.

"In the case of an attack from the sea, the hostile air-

(Continued on page 40)



A Caproni Bomber used during the World War. It indicates the advance in design since that time


SOPWITH TRIPLANE
1916
ENGINE - CLERGET 110 H.P. ROTARY.
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COLOR SCHEME - SILVER COWLING KHAKI FUSELAGE BUFF WINGS, FIN, WHEELS & TAIL. RED, WHITE & BLUE INSIGNIA.
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VICKERS GUN
WING SECTION
FEET
JOHN E. ROE / 35

Picture No. 2. Mr. Rodriguez (second from left) and his assistants.

Picture No. 1. A beautiful "job" built by M. D. Rodriguez of Mexico.

"Gas Lines"

What I.G.M.A.A. Members Are Doing Throughout the World—Outline for Forming a Unit.

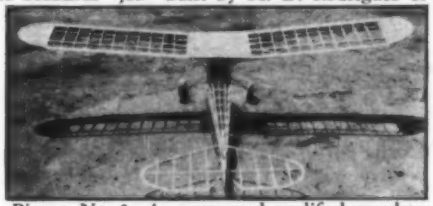
AMONG the very interesting pictures submitted this month by members, we have No. 1 and No. 2 from M. D. Rodriguez of Prado Sur. 435, Mexico D.F., which is the first news of gas model activities there that we have received. He tells us, "We Mexicans are proud to join the crew of enthusiasts in these activities. My model is of 7 ft. wing span, made of balsa and spruce, covered with silk and fitted with air wheels that cost only forty-five cents. The motor is of my own design with a 7/8" bore and 3/4" stroke. It turns a 14" propeller at 3600 r.p.m. and is supercharged. The motor is the result of four years hard work. We have had successful short flights because at an altitude of 8000 feet above sea level, you just don't get long flights." It is our opinion that Mr. Rodriguez's plane is of excellent design.

It would be quite interesting to know the design details of this fine plane, also a lot more information on the supercharged engine would be appreciated, Mr. Rodriguez. May we hear from you very often? Mr. Rodriguez is second from the left in picture No. 2.

Picture No. 3 is of a modified Loutrel Speedster built by Harold Busch of 142 Armstrong Ave., Jersey City, N.J. The model has a seven foot span and a 12½" chord and will be covered with balsa. The Speedster is a well designed model and has proven a good flyer in the past.

Mr. B. Hall, director of the Jordan Marsh Aviation League in Boston, Mass., advises us that gas model activity is progressing steadily and that a chapter will be organized there in a very short time. Until a few months ago Boston did

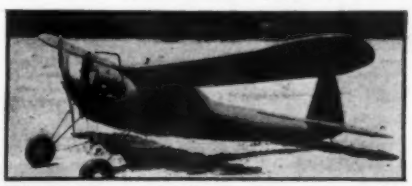
(Continued on page 41)



Picture No. 3. An uncovered modified speedster by H. Busch.

Picture No. 4. S. W. Lamberg with his model which is one of the most stable jobs ever flown.

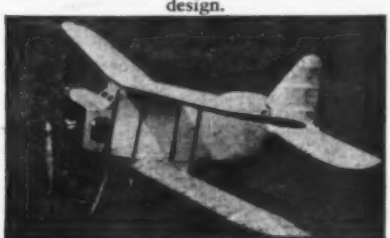
Picture No. 5. Bill Effinger and one of the first attempts at gas-powered model autogiro design.



Picture No. 8. A clever monocoque model by Alex. Buga. It weighs only 45 ounces.

Picture No. 11. Ray Scott and his Heath Parasol gas job which he has flown successfully.

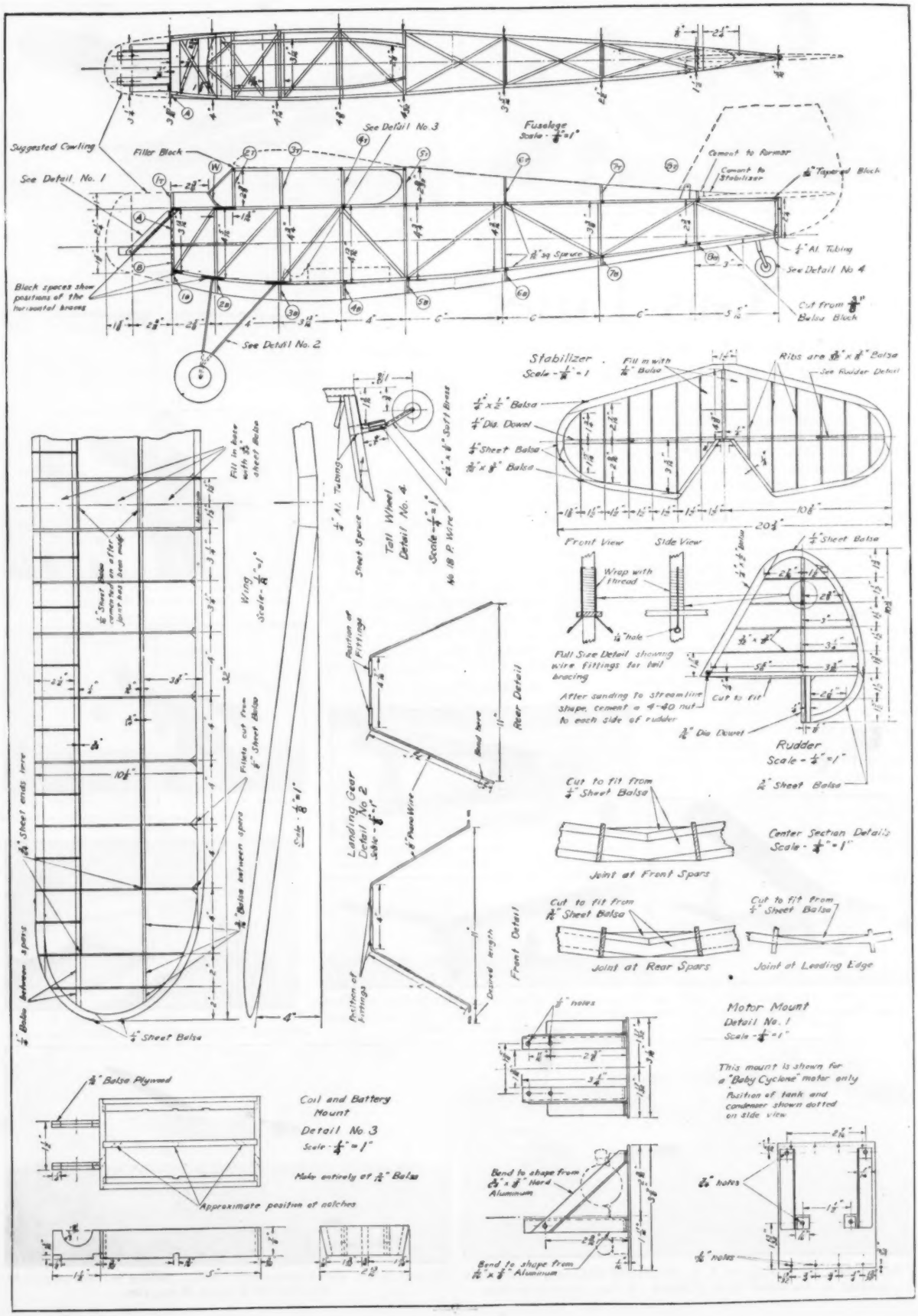
Picture No. 6. Here is a miniature K.G. by Fred Pilcher; span 5 feet, weight 2¾ pounds and powered with a Brown.

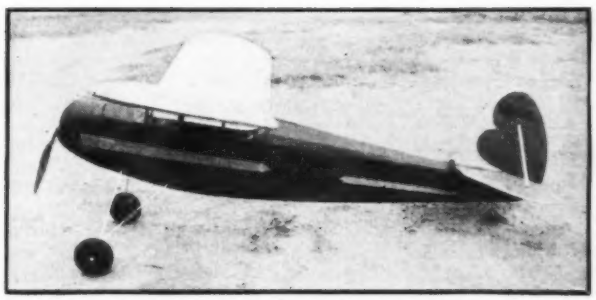


Picture No. 7. A five foot biplane by L. T. Spittle. Note the absence of interplane struts.

Picture No. 10. A K.G. by F. C. McDonald making a three point landing in Auckland, New Zealand. A very unusual picture.

Picture No. 9. Bob Scarborough's K.G. "gliding in." An unusually fine shot of a steady flying job.


Fuselage
Scale - 1" = 1"
Suggested Cowling
See Detail No. 1
Filler Block
See Detail No. 3
Cement to Former
Cement to Stabilizer
1/8" Tapered Block
1/8" sq. Spruce
1/4" Al. Tubing
See Detail No. 4
Cut from 3/8" Balsa Block
Block spaces show positions of the horizontal beams
See Detail No. 2
Stabilizer
Scale - 1" = 1"
Fill in with 1/16" Balsa
Ribs are 1/16" x 1/8" Balsa
See Rudder Detail
1/4" x 1/2" Balsa
1/8" Dia. Dowel
1/4" Sheet Balsa
1/16" x 1/8" Balsa
Front View
Side View
Wrap with thread
1/16" hole
Full Size Detail showing wire fittings for tail bracing
After sanding to streamline shape, cement a 4-40 nut to each side of rudder
1/16" Dia. Dowel
Cut to fit
1/2" Sheet Balsa
Rudder
Scale - 1/2" = 1"
1/2" Sheet Balsa
Tail Wheel Detail No. 4
Scale - 1" = 1"
1/4" Al. Tubing
Steel Spruce
1/8" x 1/8" Soft Brass
No. 18 P. Wire
Wing
Scale - 1/4" = 1"
Fill in bare with 1/16" sheet Balsa
1/16" Sheet Balsa cut to fit over ribs
Fillets cut from 1/16" Sheet Balsa
1/16" Sheet ends here
1/16" Balsa between spars
1/4" Sheet Balsa
Scale - 1/8" = 1"
Position of Fittings
Rear Detail
Bend here
Landing Gear Detail No. 2
Scale - 1/2" = 1"
1/8" Piano Wire
Front Detail
Desired angle
Cut to fit from 1/4" Sheet Balsa
Center Section Details
Scale - 1/4" = 1"
Joint at Front Spars
Cut to fit from 1/16" Sheet Balsa
Joint at Rear Spars
Cut to fit from 1/4" Sheet Balsa
Joint at Leading Edge
1/8" holes
Motor Mount Detail No. 1
Scale - 1/2" = 1"
This mount is shown for a "Baby Cyclone" motor only
Position of tank and condenser shown dotted on side view
1/16" Balsa Plywood
Coil and Battery Mount
Detail No. 3
Scale - 1/2" = 1"
Make entirely of 1/16" Balsa
Approximate position of notches
Bend to shape from 1/16" x 1/8" Hard Aluminum
Bend to shape from 1/16" x 1/8" Aluminum
1/16" holes



Efficient because of excellent streamlining

The finished plane is extremely realistic

Building the T-D Coupe

A Sleek Gas Job That Is Simple To Build and Noted for Consistent Flights

By THEODORE DYKZEUL

UNDOUBTEDLY many of you have been looking for drawings of a gas model that will fly beautifully, is easily built, can be carried to and from the airport conveniently, and last but not least, does not cost a fortune to build.

As for performance, this model flies at a fair rate of speed, climbs at about a 30° angle and has a glide of about 15 to 1. It is also built easily enough so that an experienced builder of rubber-powered models will have no trouble with the construction. The wing is removable, so that the model can be carried in the back seat of a sedan. Since Airwheels and silk were used, the cost was about $7.00, less motor. Using wood wheels and bamboo paper, the price can be cut in half.

The model has a wing span of 64 inches and an overall length of 47 inches. Ready to fly, its weight without cowling is exactly three pounds. The original model has now made 82 flights with absolutely no repairs outside of a few broken propellers and patches on the silk. It is practically crashproof having hit an office at an airport, a windbreak of trees, a concrete watering trough and a barbed wire fence. The pictures of the completed model were taken after the 46th flight.

General Instructions

Before beginning construction, study the drawings carefully and read the entire article.

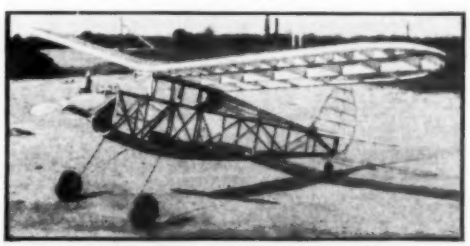
The wing, tail, and fuselage will have to be drawn out full scale. Use either a pair of dividers or follow the dimensions on the drawing. If a more accurate pattern of the wing tips and curved sections of the tail is desired, lay out ¼" squares on the drawings and 1" squares on your full scale drawings.

This plane is designed for and was flown by a Baby Cyclone. This motor is perfectly satisfactory, although other motors may be used with a change of the motor mount.

Take your time and be sure every piece is perfect before proceeding to the next. Be especially careful that the wing and tail surfaces do not become warped.

Use plenty of cement. Go over every joint at least once or twice until you are sure of a perfect cement joint. All balsa used should be of a hard grade unless otherwise stated. Use only spruce where specified on the fuselage unless you wish to pick up pieces if the first test flights do not prove entirely successful or if a solid object looms up.

Last, but not least, use only high grade materials. Poor or cheap material never has and never will make a championship model.



The structure is simple but strong

Tail Surfaces

Begin by building the stabilizer. The material for the ribs is 3/32" x ⅜" strip balsa. Cut the pieces to correct lengths and then punch out each with a ¼" hole and assemble on the dowel. This is now placed over the drawing. It will be necessary to elevate the leading edge 1/16" and the trailing edge 3/32". Put these in place as well at the center rib which is made of ¼" x ⅜" balsa. Pin or weight down the entire assembly and cement. Fill in the center section with 1/16" sheet balsa as shown and add the piece, streamlining the top of the fuselage into the tail assembly. The tips can be added now or after the cement has dried and the stabilizer taken from the drawing.

The rudder is built in the same manner as the stabilizer with the exception that 3/16" doweling is used instead of ¼". Cut the curved outline before beginning assembly.

Leave the rudder and stabilizer dry over night. Now trim both to a streamline shape with a razor blade and finish them with a sandpaper block using 00 fine sandpaper.

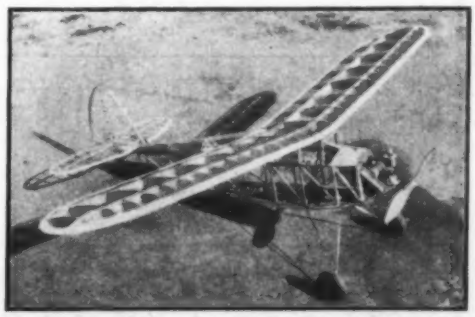
Make the wire fittings as shown in the detail. Cement one on each half of the top side of the stabilizer and one on each side of the rudder. Be sure to bind with thread. Drill a ⅛" hole in the leading edge of the rudder and mount a 4-40 nut firmly on each side. This will be used for adjustment.

Wing

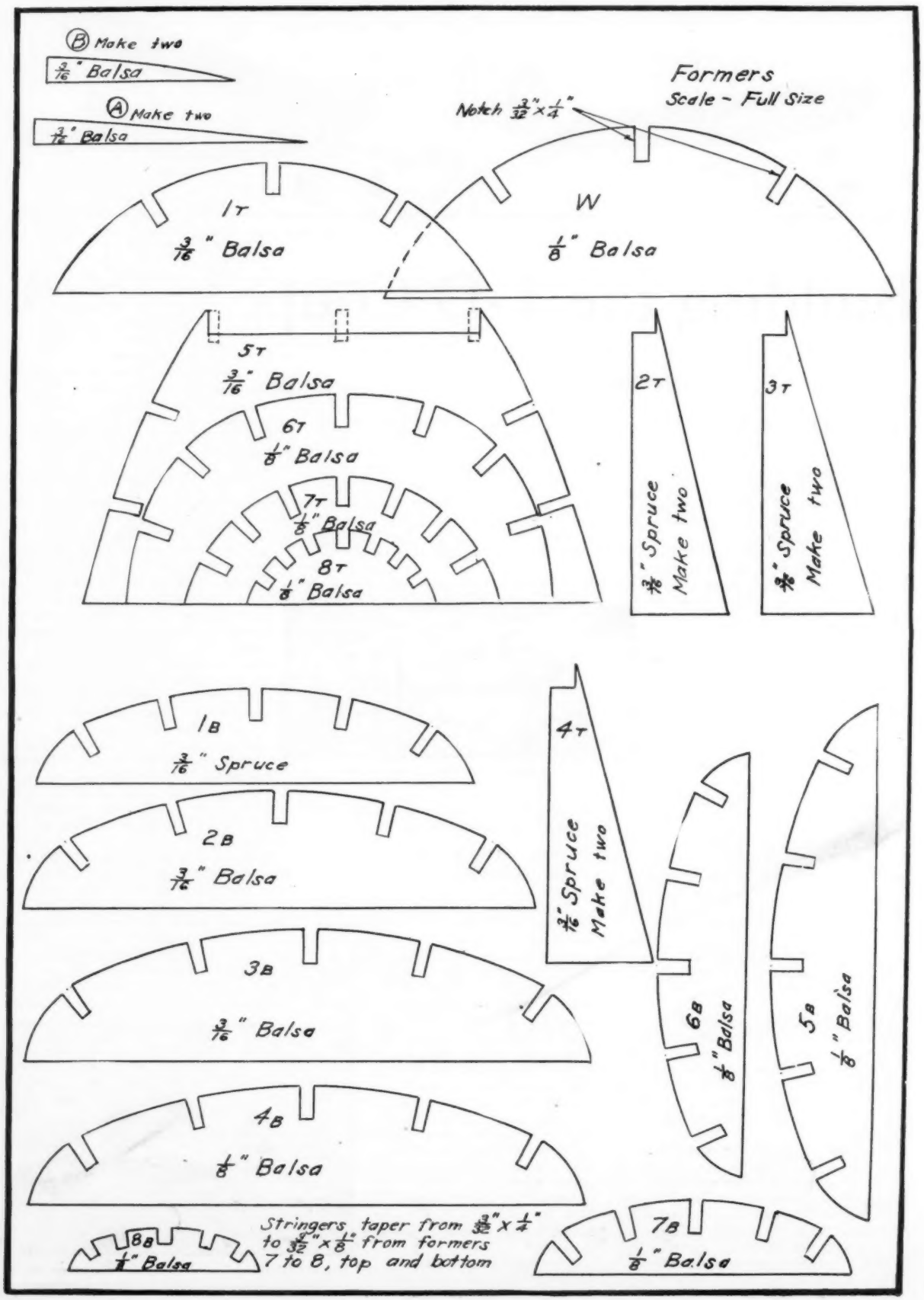
Make the entire set of wing ribs. The sizes and number of each are noted on the drawing. Begin by building one half of the wing, laying the bottom front spar, the bottom rear spar, and the trailing edge in place. Now cement the wing ribs in place. The top front spar, top rear spar, false ribs and leading edge are now cemented in place. The spars are brought straight out and are not curved on the ends. No special rib pattern is given for the second wing rib from the end as the entire wing tip will be shaped later. Cement 3/64" sheet balsa on the back of the front spar and on the front of the rear spar as shown on the drawing, thus making a single spar of each. Fill in the remaining space on the front spar near the tip with ¼" sheet balsa, and on the rear spar with 3/16" sheet balsa. Do not forget the ⅛" sheet balsa fillets at the trailing edge.

After the wing panel is entirely dry, take the wing off the drawing and assemble the wing tip. Cement the wing tip in its proper place. Fill in the remaining portion directly above and below the leading edge with 3/16" or ¼" medium balsa. Also build up the wing tip using the same size wood so that it might be shaped easily.

The leading and trailing edges are now roughly shaped as far in as the center rib.



The uncovered frame showing the mounting of the Baby Cyclone motor with which it is powered


B Make two
3/16" Balsa
A Make two
3/16" Balsa
Formers
Scale - Full Size
Notch 3/32" x 1/4"
1T
3/16" Balsa
W
1/8" Balsa
5T
3/16" Balsa
6T
1/8" Balsa
7T
1/8" Balsa
8T
1/8" Balsa
2T
3/16" Spruce
Make two
3T
3/16" Spruce
Make two
1B
3/16" Spruce
2B
3/16" Balsa
3B
3/16" Balsa
4B
1/8" Balsa
8B
1/8" Balsa
4T
3/16" Spruce
Make two
6B
1/8" Balsa
5B
1/8" Balsa
7B
1/8" Balsa
Stringers taper from 3/32" x 1/4"
to 3/32" x 1/8" from formers
7 to 8, top and bottom

Also shape the wing tip, and then with the air of a sandpaper block, finish the entire portion.

Build the other half of the wing in the same manner. The center section details for joining the two halves are shown on the drawing. Cement 1/16" sheet balsa on the back of the front spar joint and wrap with thread. Sheet balsa is also cemented on the front of the rear spar joint and wrapped. Fill in the bottom of the center section with 3/32" sheet balsa. Wrap a piece of 32 gauge aluminum, 3/8" x 3¼", around the trailing edge to prevent damage.

The dihedral should prove enough, although more can be used if desired.

Landing Gear

Bend both pieces of the landing gear of ⅛" piano wire as shown in detail No. 2. Wrap the joint of the two pieces with small copper wire and solder firmly.

Next make the fittings, noticing that allowance must be made for the curve in each. Drill out 1/16" and then solder them to the landing gear.

The wheels should be about 3¼" in diameter, preferably Airwheels.

Fuselage

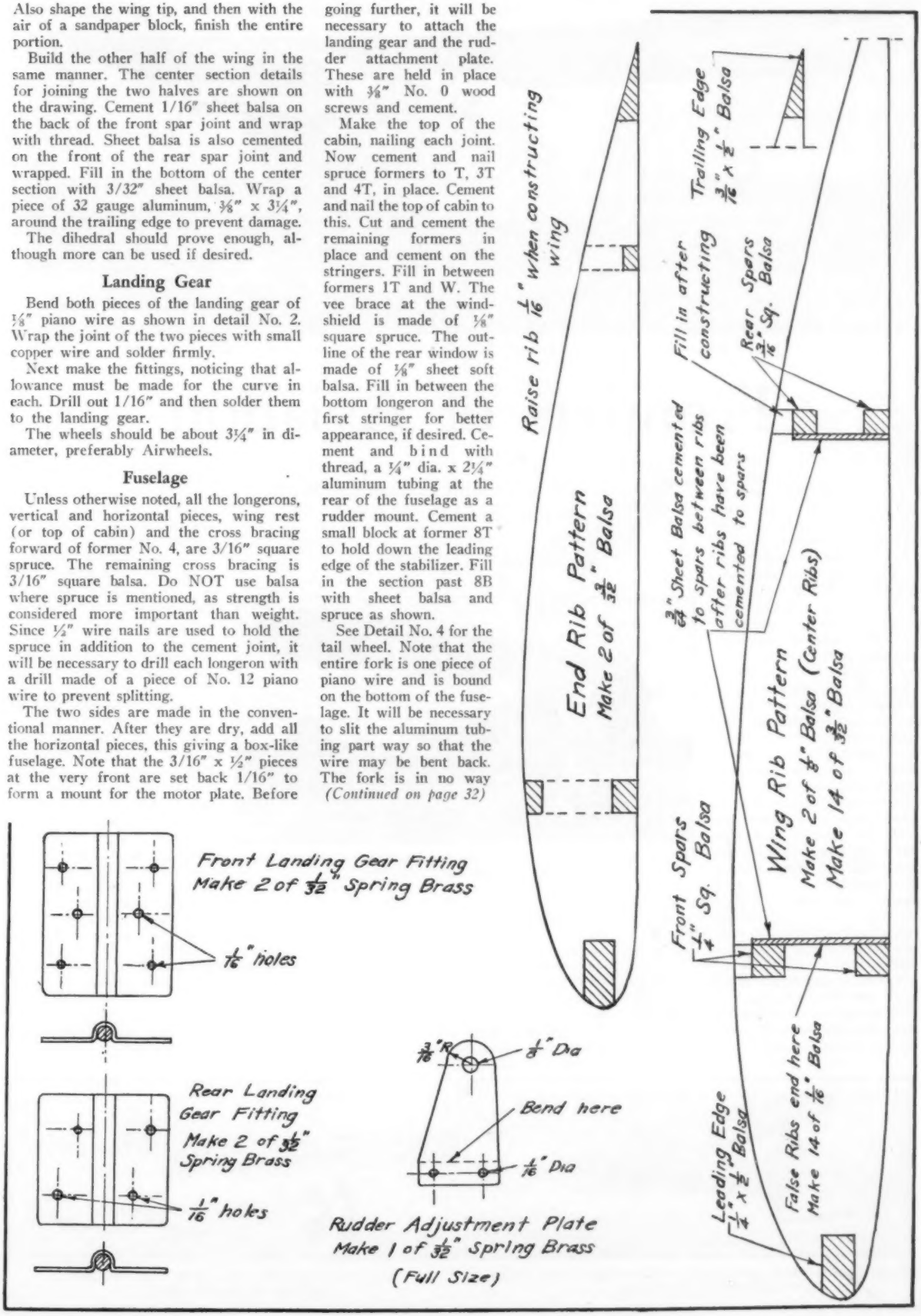
Unless otherwise noted, all the longerons, vertical and horizontal pieces, wing rest (or top of cabin) and the cross bracing forward of former No. 4, are 3/16" square spruce. The remaining cross bracing is 3/16" square balsa. Do NOT use balsa where spruce is mentioned, as strength is considered more important than weight. Since ½" wire nails are used to hold the spruce in addition to the cement joint, it will be necessary to drill each longeron with a drill made of a piece of No. 12 piano wire to prevent splitting.

The two sides are made in the conventional manner. After they are dry, add all the horizontal pieces, this giving a box-like fuselage. Note that the 3/16" x ½" pieces at the very front are set back 1/16" to form a mount for the motor plate. Before going further, it will be necessary to attach the landing gear and the rudder attachment plate. These are held in place with ⅜" No. 0 wood screws and cement.

Make the top of the cabin, nailing each joint. Now cement and nail spruce formers to T, 3T and 4T, in place. Cement and nail the top of cabin to this. Cut and cement the remaining formers in place and cement on the stringers. Fill in between formers 1T and W. The vee brace at the windshield is made of ⅛" square spruce. The outline of the rear window is made of ⅛" sheet soft balsa. Fill in between the bottom longeron and the first stringer for better appearance, if desired. Cement and bind with thread, a ¼" dia. x 2¼" aluminum tubing at the rear of the fuselage as a rudder mount. Cement a small block at former 8T to hold down the leading edge of the stabilizer. Fill in the section past 8B with sheet balsa and spruce as shown.

See Detail No. 4 for the tail wheel. Note that the entire fork is one piece of piano wire and is bound on the bottom of the fuselage. It will be necessary to slit the aluminum tubing part way so that the wire may be bent back. The fork is in no way

(Continued on page 32)



The new Curtiss 03C-1 observation plane, 135 of which are now being delivered to the U. S. Navy

Frontiers of Aviation

Latest Developments in Commercial and War Aircraft in Various Parts of the World —How to Build the NA-16-4

By ROBERT C. MORRISON

EIGHTY million dollars for two giant non-streamlined steamships, the "Queen Mary" and its proposed sister ship, and nothing allotted for any sort of lighter-than-air craft; that is England's record at this writing. France has been running neck-and-neck with England in the matter of boats and airships. They are still tied with one bulging over-size steamship apiece and each with sad memories of ill-fated airship projects. An entire trans-Atlantic zeppelin line could be formed and several airships built for what it cost to build the "Queen Mary." England flattened out her last evidences of ever being in the zeppelin industry when she ordered a steam roller to roll out the R-100 for junk. Mother Nature in the form of fierce gales demolished all that France ever boasted of in the way of airships. Italy had to send her pride and joy, the "Norge," up to the North Pole before she could finally dispose of it. Acting as chief demolisher was General Nobile on that expedition.

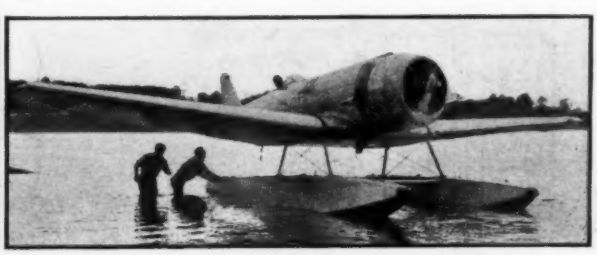
In this country we can still boast of having a sort of lighter-than-aircraft industry even though it is half-baked at the present time. We still have all sorts and sizes of non-rigid ships and even one "Los Angeles." Try as hard as we could to dispose of her by mooring her out in all kinds of weather, we still have the "Los Angeles" intact—and now we hear of recommissioning her! Our airship situation is somewhat similar to our aircraft carrier situation which lasted only a short while when we had a brand new carrier but no planes to put on it. Now we have three huge zeppelin docks but no zeppelins. One of their main uses now is for holding indoor model airplane meets.

Here is a rare picture, an unknown Japanese single-seater. (Courtesy Chas. Woods and F. Crank)

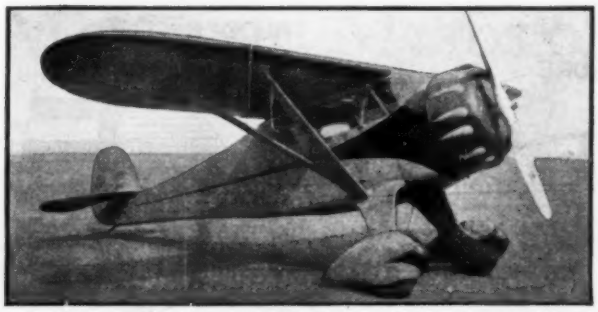
For more cheerful news we must look to Germany. As everyone knows, she has had extraordinary success with her "Graf Zeppelin" and "Hindenburg" and no sooner was the huge "Hindenburg" completed than it was moved from its birthplace and sections for a second sister ship were moved in—and now comes word that still another airship will be built. Just what will be the details of these new airships has not been disclosed, but it is known that they will differ slightly from the "Hindenburg." One may probably be smaller and faster and both will be used for trans-oceanic passenger service.

The successful voyages of the "Hindenburg" have stirred up much interest in the airship once more. In England, that famous editor, Mr. C. G. Grey, in his twenty-five year old publication, "The Aeroplane," suggests that England begin construction at once of three airships—one a full-size ship like the "Hindenburg," a metalclad medium-size airship (a larger version of our "bubble" blimp), and an experimental zeppelin using the geodetic construction (interlocking spars) invented by Mr. Wallis, noted English aeronautical

The Stinson SR-7B, powered by a Lycoming 245 hp. engine. (Photo by W. Shipp)



The Stearman Alpha 4-D, formerly a Northrop. (Photo by Warren Shipp)



The Clipped Wing Monocoupe 110 special which flies 200 m.p.h. with a 145 hp. engine

A very rare ship, Laird LC-DC Racer, with 145 hp. Ranger engine (Williams from Canary)

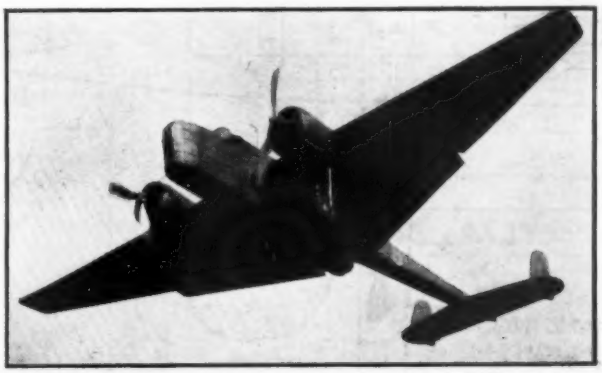
engineer.

In this country there has been much said about building a large airship with stressed skin construction. It should make a very reliable airship if it could be built light enough.

The Goodyear-Zeppelin Corporation has designed an airship to carry 80 passengers with all the luxuries of an ocean liner and may soon begin construction if financial backing can be arranged. They have also considered the carrying of airplanes on board an airship, and when it nears the coastline after an ocean voyage, the airplanes may be dispatched full of cargo to all major cities within a radius of hundreds of miles.

The use of the zeppelin as a military weapon is not being considered very seriously these days, but as an economical commercial transport, there is no question that the zeppelin will play a major part in trans-oceanic trade within the next few years. At the present time, the airship is far more efficient than the modern airplane for flights of over 1,200 miles because of its greater range and load-carrying capacity. However it is doubtful that airships will be built much larger than the "Hindenburg" as they have about reached their maximum size from a practical standpoint. On the other hand, the airplane has yet to grow and it should not be long before we will have airplanes that will carry loads just as large as those on airships and able to fly at double the speed. It is this writer's belief that the airplane will be the dominating means of air transportation across the Atlantic and Pacific in the future and that the airship's present superiority is temporary.

Mr. Klinehaus, project engineer for the Douglas Company, recently lectured before a meeting of the Institute of Aeronautical Sciences as to what might some day be the maximum size of a flying boat and what its performance might be. He discussed boats ranging all the way up as high as 70,000 tons! Of course a plane of such proportions may never be built but it is interesting to see just what the performance would be. Mr. Klinehaus picked out one flying boat of about 30,000 tons and went into detail about it. The hull of such a plane would compare similarly with the hull of a ship like the "Normandie." 500 passengers could be carried on the plane plus all their necessary baggage and a huge cargo of mail and express with a cruising range of 4,500 miles if necessary. Cruising speed would be well over 300 m.p.h. and landing speed would be 150 m.p.h.! This landing speed may seem high, but considering the size of the airplane such a speed would be comparatively low. It would require about ten miles of open water for such a plane to take off, and of course landings and take-offs would be negotiated in ocean waters. Probably a smaller airplane would scout the take-off area before the huge flying boat started on its journey.



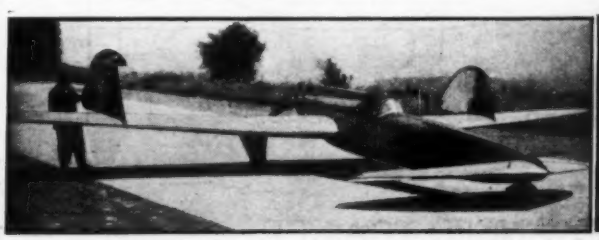
The new Handley Page Day and Night Bomber which has a high speed comparable with fighters. Armament is enclosed

The hull was calculated to be about 60 feet high from the water line. Propellers would be about 60 feet in diameter and would have a tip speed about the same as our present props. Therefore, the number of revolutions per minute would be much less. The greatest problem in designing such a plane would be getting the power to drive it. Of course it would be out of the question to pack a few thousand Wright Cyclones into the ship, but the problem might be solved by using huge Diesel engines.

Twelve hour trans-Atlantic service could be maintained with ease. A different type of passenger would arise with the development of such a service. There would be the passenger who was just going to Europe for the week-end on business or pleasure. The high rate of speed for the trip would encourage this sort of passenger. He would not have to take a huge steamer trunk along and thus this weight-saving would increase the passenger-carrying capacity of the plane. All the luxuries of an ocean liner were contemplated—except a swimming pool. There will be little reason for steamship companies to stay in business if such planes are built, but it is probable that many decades are yet to pass before we will see one if ever.

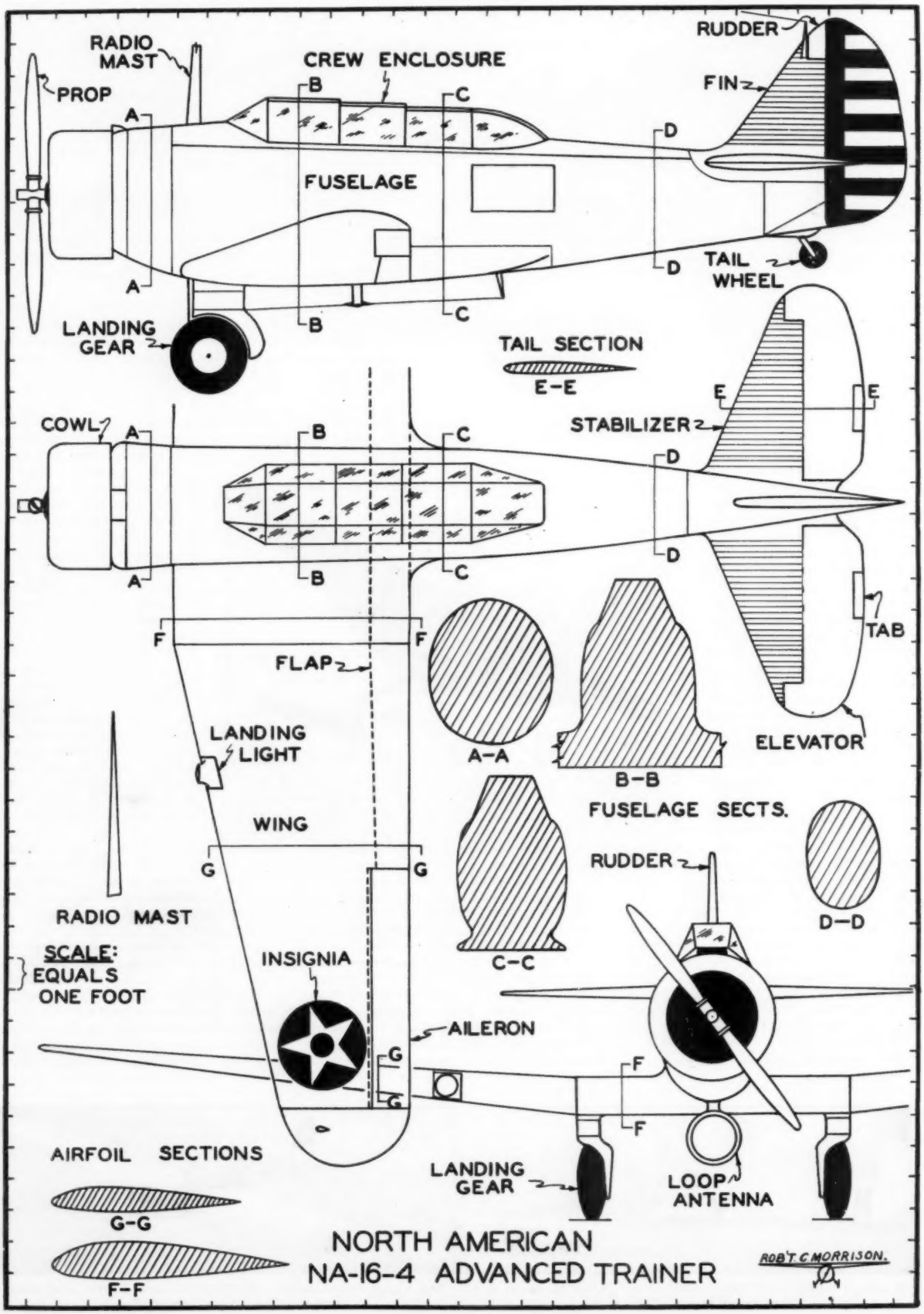
Pan American Airways is slowly developing flying boats into huge proportions though at present they have only been thinking in terms up to 200 tons. The Douglas Company is now collaborating with Pan-American Airways for a huge trans-oceanic airliner to carry about forty passengers. It will be a flying boat of course.

(Continued on page 36)



A midget pusher now being tested by its Italian inventor. A 17 hp. motor flies it (Soibelman)

The Vickers Supermarine "Wellesley," a new British long range bomber (Globe from Topical Press)


RADIO MAST
PROP
CREW ENCLOSURE
RUDDER
FIN
FUSELAGE
TAIL WHEEL
LANDING GEAR
TAIL SECTION
E-E
STABILIZER
COWL
TAB
FLAP
LANDING LIGHT
A-A
B-B
ELEVATOR
FUSELAGE SECTS.
WING
RADIO MAST
C-C
D-D
SCALE: EQUALS ONE FOOT
INSIGNIA
AILERON
AIRFOIL SECTIONS
G-G
F-F
LANDING GEAR
LOOP ANTENNA
NORTH AMERICAN
NA-16-4 ADVANCED TRAINER
ROB'T C. MORRISON.

Ways and Means of Gas Model Success

Suggestions From an Expert That Will Enable You to Improve the Flight of Your Gas Job

Part No. 3

By JOSEPH KOVEL

NO MATTER how well a gas model may fly, or how perfectly it glides, there is always a time when something goes wrong. "Into each life some rain must fall." The ship may either fly into something or hit some obstruction while coming in for a landing. Although this mishap is comparatively rare, it is entirely possible that the model might be hit by an auto while landing. (Yes, it happened to me once!) Then there's always the chance that the crate, reverting to nature, might land in a tree or on some telephone wires, thinking it is a bird (probably a cuckoo). If you get it down uninjured, you're one of the lucky few! The fact remains that sooner or later, there will be some repair work to do. Don't be satisfied with a make-shift job. Of course, there are times, at contests for example, when you haven't much time for an elaborate repair job. In that case, it's all right to do a temporary job, but just as soon as you have the time to do so, ascertain the total extent of the damage, remove the damaged parts, and replace them with new parts, so that the finished job makes it hard for the casual observer to note just where the repairs were made. In the case of a broken wing or stabilizer spar, or fuselage longeron, it would in most cases be impractical to replace the entire spar or longeron. In that case, the job would be to splice a new piece into place, and cement a gusset strip to each side of the joint.

Unless you have a real efficient landing gear, that is the part that usually comes up most for repairs. If you have a wire gear, the damage is usually limited to a couple of bent struts, which can be straightened without much difficulty. It is the woodstrut type that seems to take the most beatings. A good temporary repair job may be had by cementing a strip of wood or sheet metal to each side of the break, then winding silk over the joint, giving it a good coat of cement to finish the job.

If you expect to enter contests with your ship, do not wait until the day of the meet to test-hop your ship. Test it as soon as you can, so that you'll have plenty of time to make any necessary repairs and to take out any of the "bugs" the ship may have. If you have time, carve about four or five spare props. They're sure to come in handy some time. Arrange a carefully planned out repair kit. Don't wait for the day of the meet, then throw some tools, wood strips, cement, and anything else you may happen to think of into a tool box. Consider the possible repair jobs you may have to make, then determine what tools and supplies will be necessary to make them. Pack the items so that you'll be able to get at them when you need them.

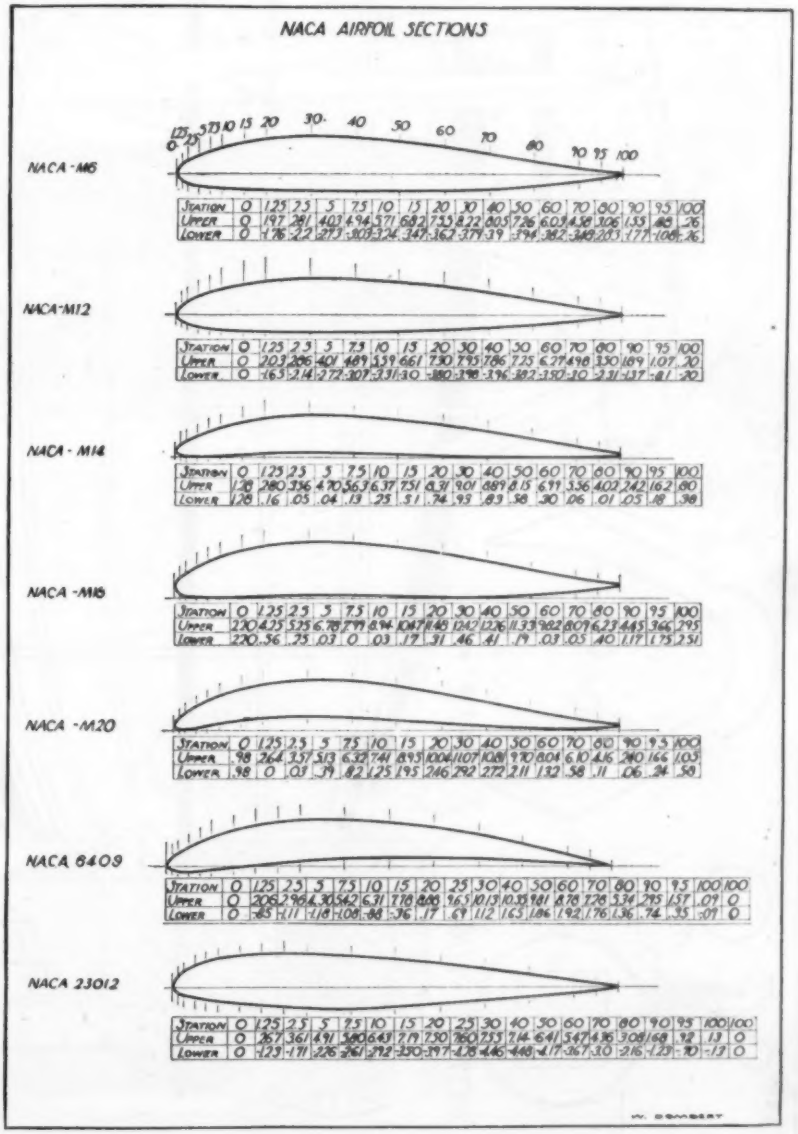
If you have a parasol job with a removable wing-mount, it might be a good idea to have an exra wing-mount or two on hand. In case of a hard landing, where the ship is brought to a sudden stop for some reason, there is a terrific strain on the wing-mount, and it might buckle, absorbing the shock and saving the wing

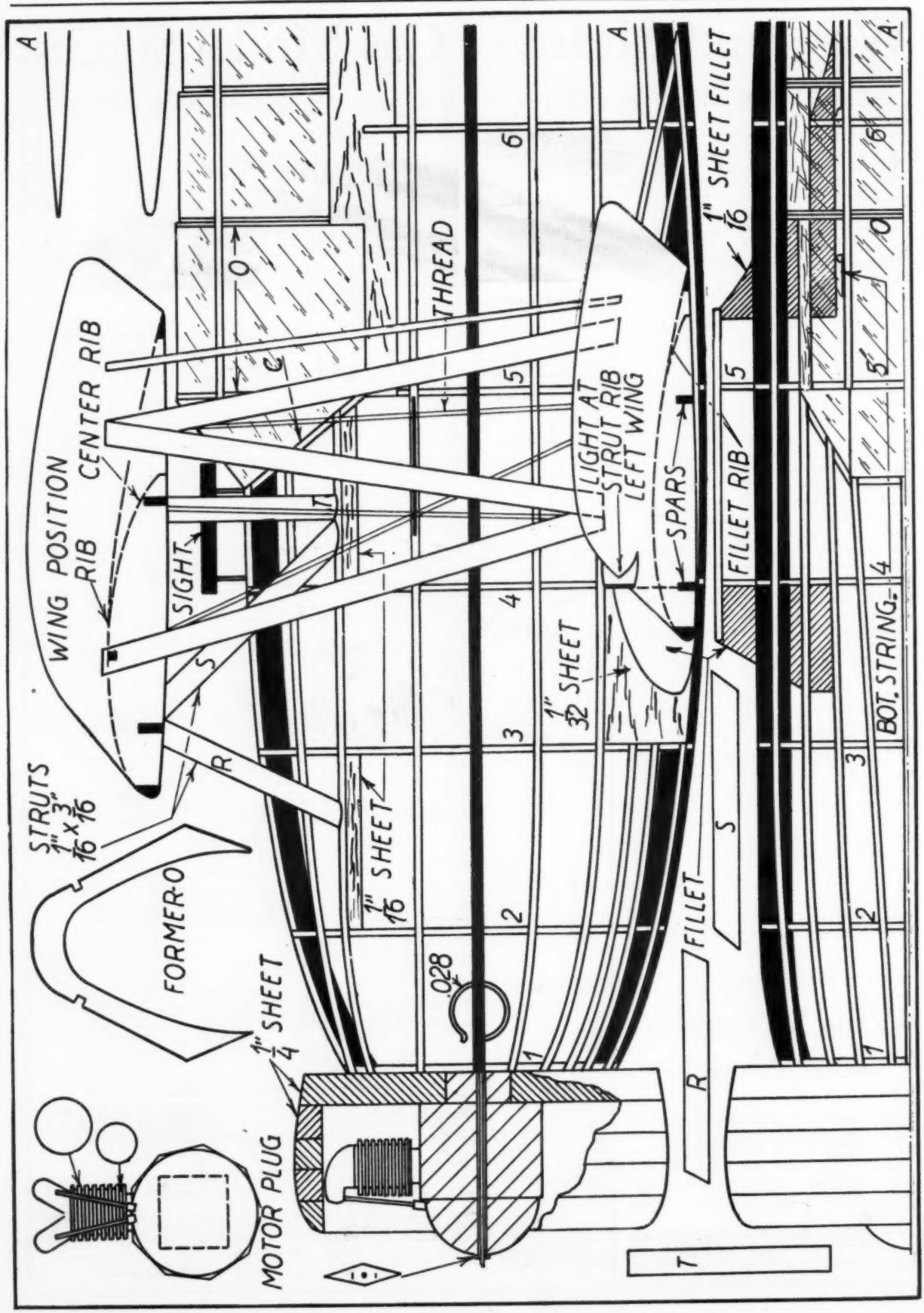
(Continued on page 41)

Wing Section for Your Models

FULL data on these airfoils may be obtained from the N.A.C.A. reports. The M6, M12, M20, M14, and N.A.C.A. 23012 are suitable for fast planes. The M20 is not only a fast section but has a reasonable degree of soaring quality and will serve as a good climbing section.

The M18 and the 6409 are fairly high lift sections and are suitable for planes of medium speed. The 6409 should be extremely adaptable to duration models.




A
WING POSITION
RIB
CENTER RIB
SIGHT
THREAD
LIGHT AT STRUT RIB LEFT WING
SPARS
1" SHEET FILLET
FILLET RIB
STRUTS 1" x 3" 16 16
FORMER-O
1" SHEET
1" SHEET
1" SHEET
32
1" SHEET
4
MOTOR PLUG
.028
FILLET
BOT. STRING.
R
S
T
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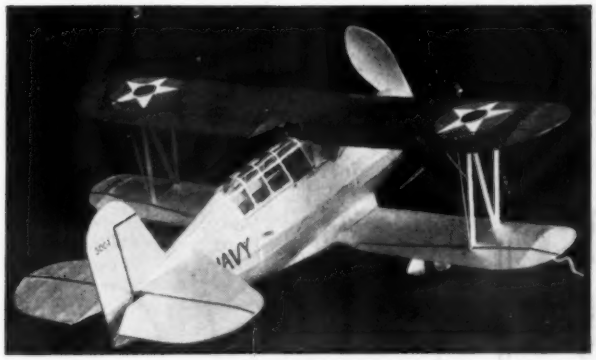
C
U
1
2
3
4
5
6
7
8
9
10



It is realistic in appearance yet it possesses design qualities that make it a steady flier

How You Can Build and Fly the SOC-1 Scout

How You Can Create a Model of a Curtiss "Navy Scout" That Flies With Great Precision

By WILLIAM WINTER

THE Curtiss SOC-1 is the latest scout-observation machine built by Curtiss for the navy.

As such, it is designed to meet the strenuous requirements of operation from battleships and cruisers. The ship is already noted for its ruggedness of structure and versatility of performance. Prominent among its many praiseworthy features are the low landing speed, excellent handling qualities and the inherent safety for the crew.

The SOC-1 is pleasing to the eye both from the standpoint of appearance and proportions. For that reason it makes an interesting model to build and fly. Because of the fine design of the large ship, you will find that the model will fly as readily as a duck takes to water.

A side view of the completed model

The constructional methods with one exception are conventional in our model. The fuselage is constructed by assembling the bulkheads on four master stringers already cut from sheet balsa. By adhering to this practice, all chance of error is eliminated.

Fuselage

Trace the side outline of the fuselage on a piece of 3/32" sheet balsa and cut two master stringers to the depth shown in black on the top view of the fuselage. The top and bottom master stringers are cut from 1/16" sheet in the same manner. Mark on all the master stringers the positions of the bulkheads.

Cut the bulkheads as shown from 1/16" sheet. Cut only the notches for the master stringers marking the positions of the auxiliary ones until needed.

Cement bulkheads No. 2 and No. 6 in place on the side master stringers. When dry, locate the remaining bulkheads. Cement the top and bottom master stringers in place.

Cement the 1/16" sq. auxiliary stringers in place, cutting the notches already marked as the work progresses.

The cockpit overhang is 1/32" sheet balsa. The lower portion of the body between the No. 3 and No. 4 bulkheads is also covered with 1/32" sheet to provide a support for the fillet block. The rudder post is a piece of 1/8" x 1/4". Bend the rear rubber hook to shape from .028 wire and attach. Reinforce the auxiliary stringers that support the center section struts with pieces of 1/16" sheet.

The cockpit formers are cut to shape from 1/32" sheet balsa. The largest marked O and shown on the plan is typical of their shape. Each one progressing rearward is smaller than the one immediately in front. As seen on the plan they are laminated when called for.

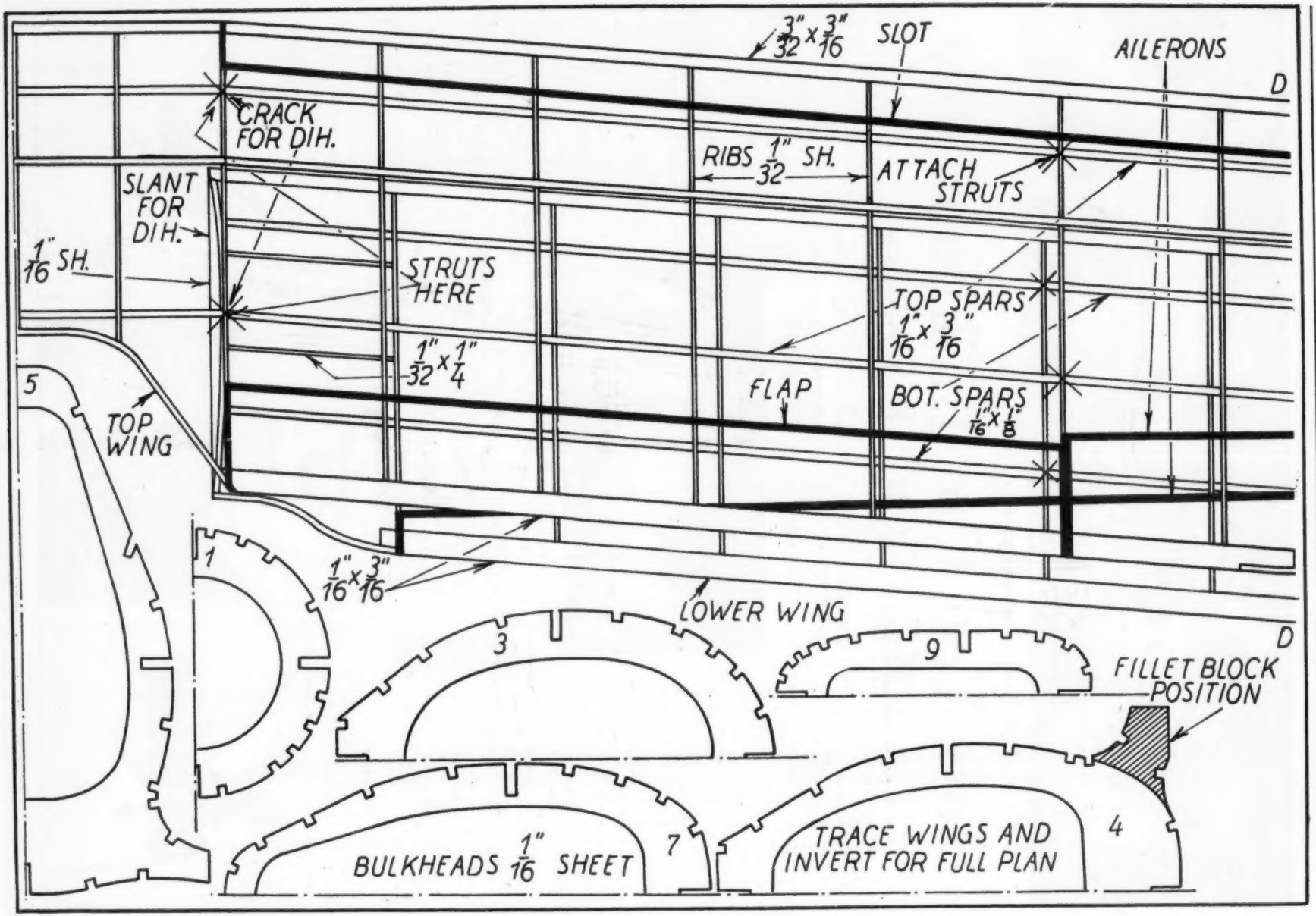
The fillet ribs are similar to the first

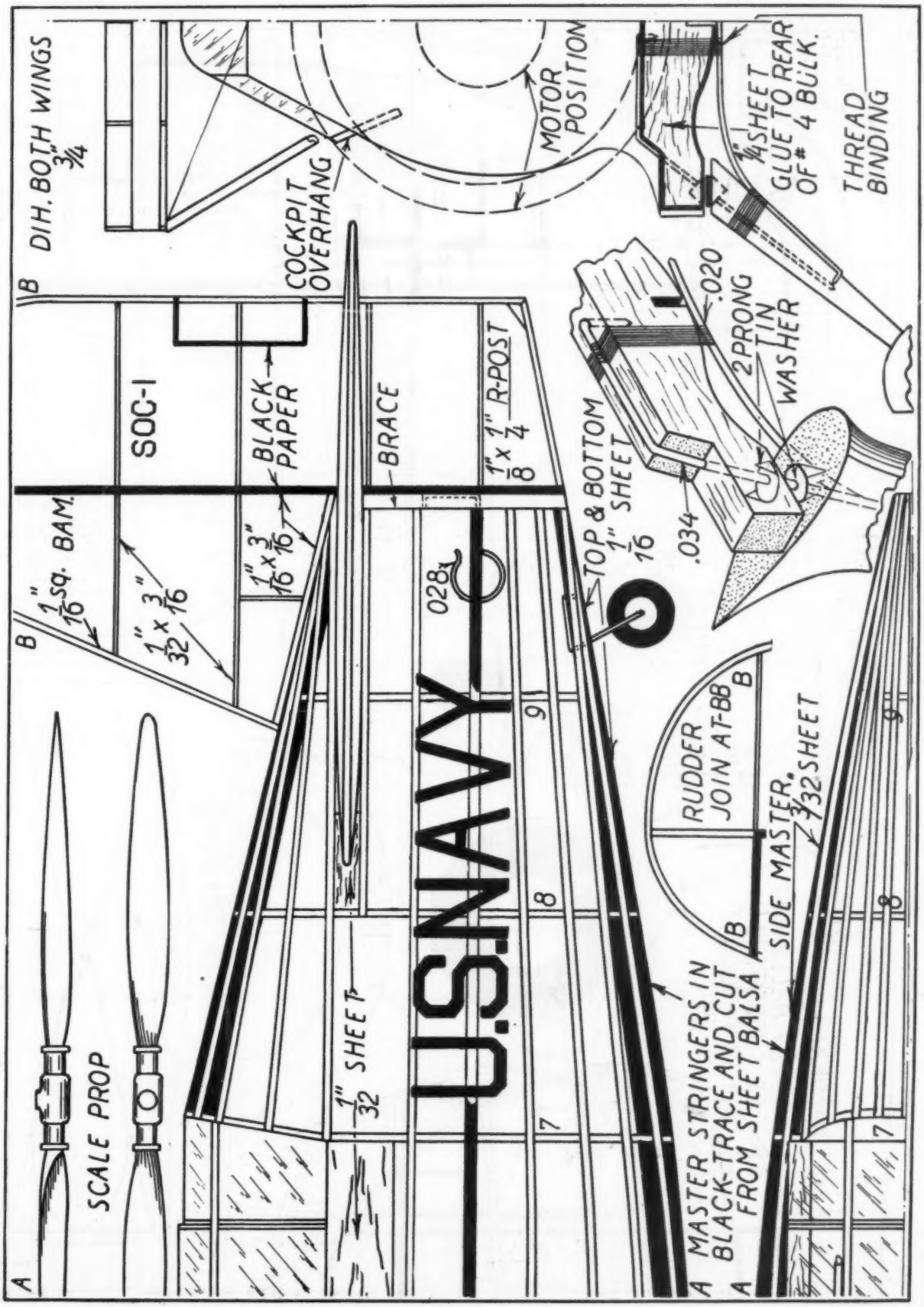
(Continued on page 35)

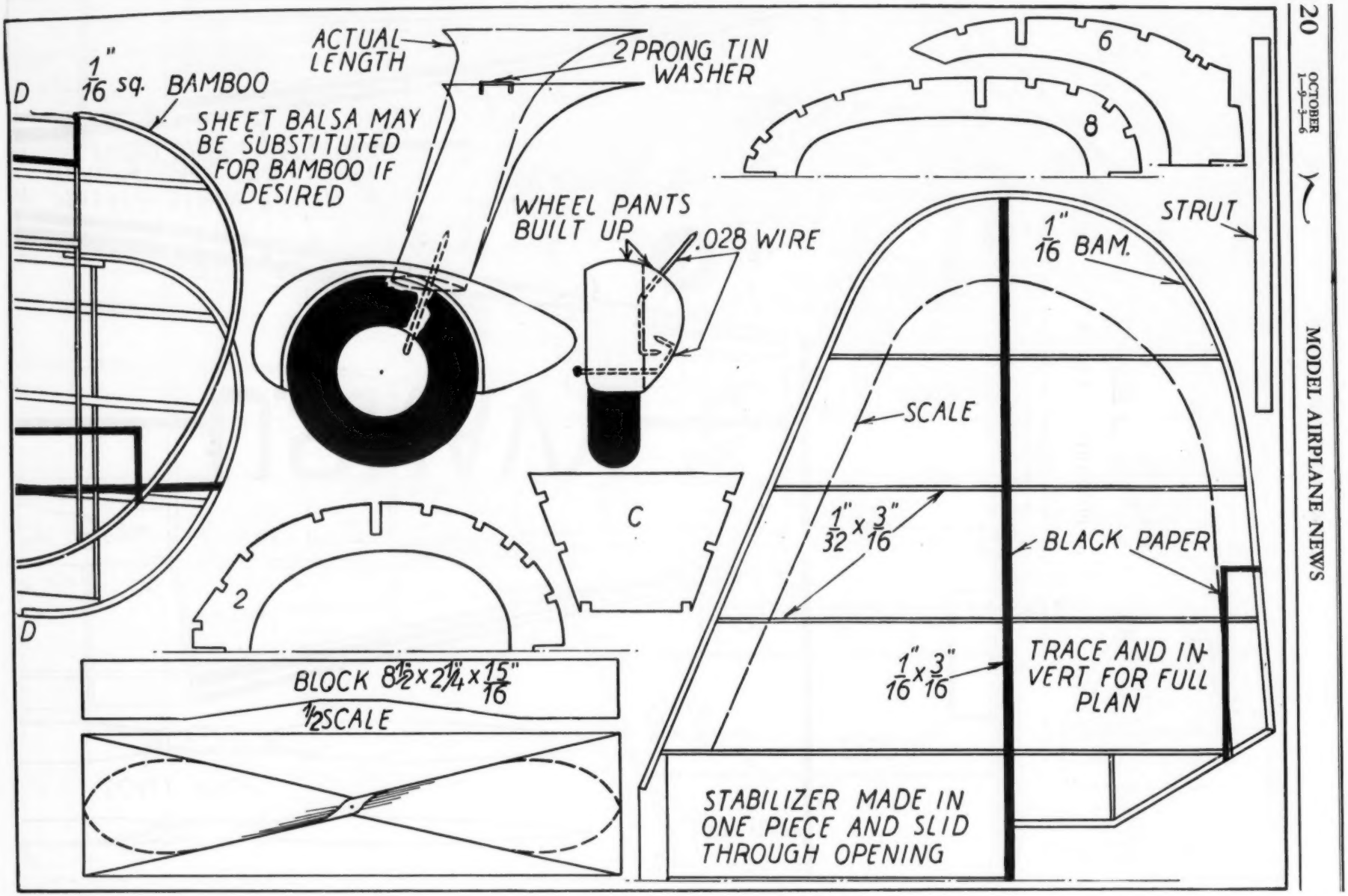
In flight, steady and stable

Climbing after it is launched

Banking in actual flight


3" x 3"
32 16
SLOT
AILERONS
D
CRACK FOR DIH.
RIBS 1" SH.
32
ATTACH STRUTS
SLANT FOR DIH.
1" SH.
16
STRUTS HERE
TOP SPARS 1" x 3"
16 16
1" x 1"
32 4
FLAP
BOT. SPARS 1" x 1"
16 8
5
TOP WING
1
1" x 3"
16 16
LOWER WING
D
3
9
FILLET BLOCK POSITION
BULKHEADS 1" SHEET
16
7
TRACE WINGS AND INVERT FOR FULL PLAN
4


DIH. BOTH WINGS 3/4"
COCKPIT OVERHANG
MOTOR POSITION
1/4 SHEET GLUE TO REAR OF # 4 BULK.
THREAD BINDING
SOC-1
BLACK PAPER
BRACE
1" x 1" R-POST
1/8 x 1/4
1/16 SQ. BAM.
1/32 x 3/16
1/16 x 3/16
TOP & BOTTOM 1/16" SHEET
.020
2 PRONG TIN WASHER
.034
028
U.S.NAVY
1/32" SHEET
RUDDER JOIN AT B-B
SIDE MASTER. 1/32 SHEET
A MASTER STRINGERS IN BLACK-TRACE AND CUT FROM SHEET BALSA
SCALE PROP
A
B
7
8
9


ACTUAL LENGTH
2 PRONG TIN WASHER
1/16 sq. BAMBOO
SHEET BALSA MAY BE SUBSTITUTED FOR BAMBOO IF DESIRED
WHEEL PANTS BUILT UP
.028 WIRE
STRUT
1/16 BAM.
SCALE
1/32 x 3/16
BLACK PAPER
1/16 x 3/16
TRACE AND INVERT FOR FULL PLAN
STABILIZER MADE IN ONE PIECE AND SLID THROUGH OPENING
BLOCK 8 1/2 x 2 1/4 x 15/16
1/2 SCALE
D
D
C
2
6
8

NAVI-GOID

The Big Contest for Future Navigators

Try This and Learn to Navigate Your Plane

Contest No. 3

By EDWARD L. SEMLER

Author's Note:

The correct procedure to be followed during this contest series was fully explained in three articles printed in the February, March and April issues of the *Model Airplane News*. It will be necessary for the contestant to have these articles for guides. If you are unable to locate these issues, write to *Model Airplane News*, 551 Fifth Avenue, New York City, enclosing *twenty-five* cents, and the copies will be forwarded to you at once.

The instruments you will need:

A sharp pencil.

An accurate pair of dividers.

A protractor. (The protractor will give the degrees of the compass).

Be sure to thoroughly read every detail given in the problem. Write the intervals of time on a separate sheet of paper and with the information given, find the true course, the speed and the distance flown in each of these time-intervals. I would suggest that you designate each new position as you go along.

Each Navi-Goid will be judged as an individual contest. The prizes, consisting of the choice of any $5 (or less) model plane kit advertised in *Model Airplane News*, going to the five correct or most nearly correct answers received; in case of tie, the entrants to be judged on the Post Office Time Stamp. The decision of the judges will be final.

IT WAS past midnight. The streets were dark, rain-drenched mirrors reflecting the feeble boulevard lamps that tried so vainly to pierce the dismal shadows. Doorways and windows were mere black pits in the silent walls of the city. Munich was asleep.

In vivid contrast, the government building seemed to flare with lights. Three stories high, it stood, bleak grey stone walls, and from every window light cast a yellow beam.

Uncertainty and tension charged the atmosphere inside the building. Staff officers of the *reichswehr* conversed in low tones, strolling nervously up and down the long halls.

The zeppelin, *Dortmund*, had ceased radioing.

* * * *

A staff car swept down the quiet boulevard like some large, twin-eyed beetle and drew to a stop before the government buildings. Figures alighted. The car plunged on into the night.

The figures hammered on the door. There was a hurried drumming of boots on the hall flooring. A block of yellow light leaped across the boulevard as the door swung open.

The soldier saluted briskly as the two arrivals entered. He relieved them of their service coats and they made their way towards the stairs.

"I'm going in and see Koppen. I shall let you know if he has learned anything."

His companion nodded and climbed the stairs as the other entered one of the lower floor rooms. He was met on the second floor by an orderly.

"Have you received any wires?"

The orderly shook his read. *"Nein, Herr Hauptmann*, the *Dortmund* will not reply to our calls."

* * * *

The telephone operator fed the staff circuit into the main switchboard. A voice answered on the extension. *"Was dichts?"*

"Kommandant Wöller wishes to speak to Hauptmann Schlesmann. Official communications."

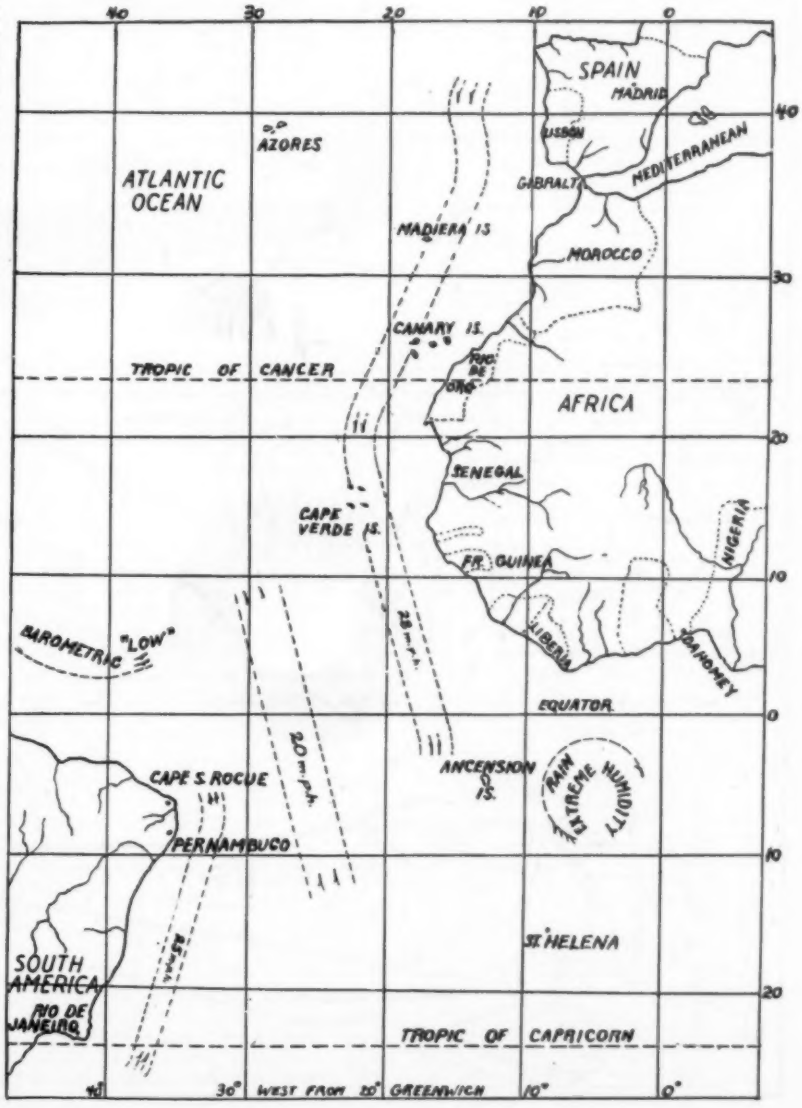
There was silence on the extension as the captain was summoned.

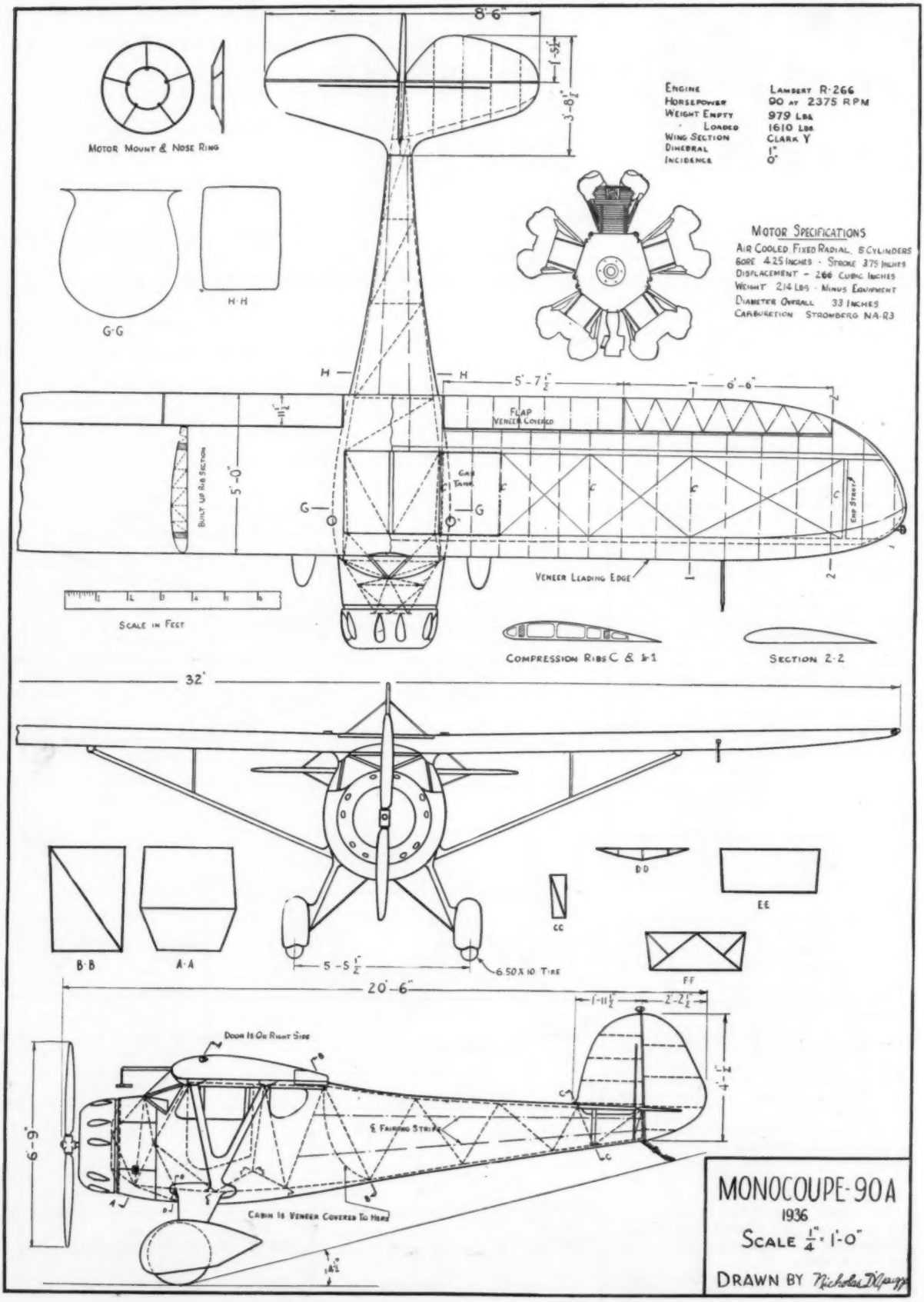
Then: "Hauptmann Schlesmann speaking."

"Line open, Leipzig," the operator signaled.

The lights glowed. Two red and one green. Obediently, the operator discon-

(Continued on page 32)




8'-6"
1'-5½"
3'-8½"
Motor Mount & Nose Ring
G-G
H-H
Engine Lambert R-266
Horsepower 90 at 2375 RPM
Weight Empty 979 Lbs.
Loaded 1610 Lbs.
Wing Section Clark Y
Dihedral 1°
Incidence 0°
Motor Specifications
Air Cooled Fixed Radial, 5 Cylinders
Bore 4.25 Inches - Stroke 375 Inches
Displacement - 266 Cubic Inches
Weight 214 Lbs. - Minus Equipment
Diameter Overall 33 Inches
Carburetion Stromberg NA-R3
5'-7½"
6'-6"
Flap Veneer Covered
Built Up Rib Section
5'-0"
Gap Trim
End Struts
Veneer Leading Edge
Scale in Feet
Compression Ribs C & 1
Section Z-Z
32'
B-B
A-A
5'-5½"
6.50 X 10 Tire
CC
DD
EE
FF
20'-6"
1'-11½"
2'-2½"
Door Is On Right Side
6'-6"
Fairing Strips
Cabin Is Veneer Covered To Here
MONOCOUPE-90A
1936
Scale ¼" = 1'-0"
Drawn by Nicholas D'Agostino

Designing Your Fuselage Model

Vital Points in The Procedure of Design That Will Enable You to Design Fuselage Models of Unsurpassed Stability.

Chapter No. 5

Article No. 55

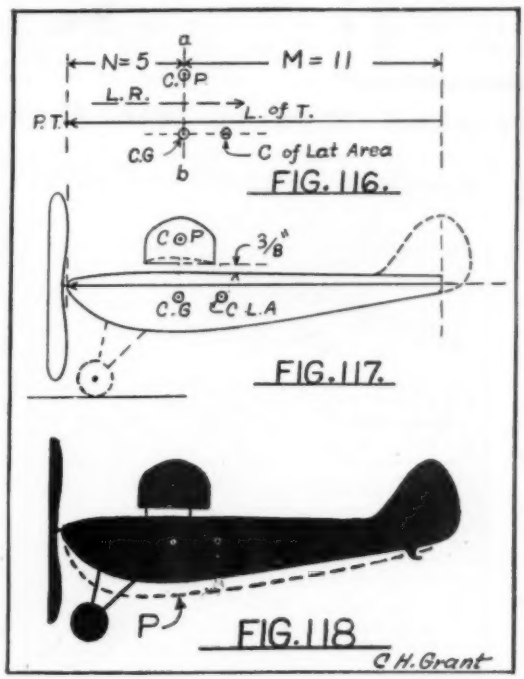
Part No. 2

By CHARLES HAMPSON GRANT

THE first part of this discussion on fuselage model design was published in the September issue of MODEL AIRPLANE NEWS. It is advisable to read it before the following second part is considered. By doing so, a clearer conception of the problem of fuselage model design and its solution will be obtained.

It was shown in the last part of the preceding article how certain parts of the model's structure should be arranged to conform with the "stable" force arrangement. The correct position of the propeller, the wings and the top of the fuselage were established. It was necessary to consider these factors first, for the size and position of the tail surfaces, the landing gear and the position of the bottom of the fuselage depend upon their size and arrangement.

The general objective which is to be kept in mind while establishing the design of the remaining structural parts, is to have the final resulting C. of G. and Directional Center located so that they will coincide exactly with the points which have been selected as the most desirable for their location from a stability standpoint. The selected positions for the C.G. and the D.C. are shown in Diagram No. 117, September issue.



Fin Area

The next step is to determine the size or area of the *fin* (vertical tail surface). Its distance from the wing center to center, has been established as 11 inches in the preceding article. The area may be established by using the general rule for this type of plane. It is: make the fin area equal to about 10% of the wing area when the moment arm is one-half the wing span. In this case the moment arm is 11 inches. One-half the span is 12 inches. Thus the fin area should be 10% of the wing area, multiplied by (12/11) or about 10.8% of the wing area. In this design however, the wings will be well tapered at the tips for efficiency's sake, which has the effect of reducing the effective span. Therefore the fin area may be made a little less than in normal cases of rounded wing tips. If a value of 10% of the wing area is selected, or (1/10 x 70) = 7 sq. inches, satisfactory results should be obtained. The fin should be laid out then, so its area (one side) should equal (7) square inches. Its shape should be made *approximately* as shown in Diagram No. 117.

If an exact value for the fin area is desired, which takes into account variations in the corrective effects of the low center of gravity, length of the nose of the model, position of the line of thrust, etc., then the fin area should be determined by means of the formula that was used in the case of the stick model design, which is as follows:

$$a_F = (D/8)0.1(A/M)(3+N+0.58\sqrt{ST_T}).$$

Though this formula is accurate for a stick model, when it is applied to a rubber-powered fuselage model, the value obtained by solution of the formula should be multiplied by (0.85). This gives a fin area value which is less than that required for the stick model. This is sufficient for the fuselage model because the fuselage provides considerable vertical area to the rear of the wing. This in effect is equivalent to a certain amount of fin area; approximately 15% of the normal amount of area required.

For determining the correct fin area for gas engine powered models, multiply the formula for the *stick model* by (0.64).

The formula for fin area of a rubber-driven fuselage model is then:

$$a_F = (D/8)0.1(A/M)(3+N+0.58\sqrt{ST_T}) \cdot 0.85.$$

In the formula, a_F = fin area required; D = propeller diameter; A = total wing area; M = the tail moment arm; N = the length of the nose of the fuselage, (see Diagram No. 116); S = the wing span; and T_T = the amount each wing tip is raised above the center point of the wing. With the proper quantities, which have been established previously, inserted in the formula, the formula appears as follows:

$$a_F = 0.1(8/8)(70/11)(3+5+0.58-\sqrt{24\times1.75})0.85.$$

Solving, $a_F = (7.5)0.85$

$= 6.38$ SQUARE INCHES.

Thus the value of 6.38 square inches for the fin area, specified by the formula, is close to the value of 7 square inches given by the general rule. This is because the values of the aerodynamic factors of the model are average ones. However, if the design should be graced with an unsually large propeller, a large dihedral or long nose, the formula value would be at considerable variance with the general rule. The formula value would be accurate, while the rule would give a value that would be merely approximate.

Stabilizer Area

The next consideration in the design of the model is the amount of stabilizer area to use. The general rule is: *make the stabilizer with an area equal to 1/3 the wing area.* Following this rule, the stabilizer area should be (1/3 x 70) or 23.3 square inches. Due to the good sized aspect ratio and the low center of gravity relative to the C. of L., an area of 30% of the wing area could be used with safety. When in doubt however, it is always wise to use too much rather than too little stabilizer area.

The exact method of stabilizer area computation however is by means of the formula. The formula is as follows:

$$a_S = \frac{(D/8)(A/3M)(2C+N)\left[1-\left(\frac{Q+2X/M-2}{5}\right)\right]}{\left(1-\frac{(G+2T)}{4C}\right)}.$$

In the formula; a_s = required stabilizer area in square inches; D = the propeller diameter; A = the wing area in square inches; M = the length of the stabilizer moment arm; C = the chord of the wing; N = the distance from the center of the wing to the rear face of the propeller hub; Q = the difference in angle between the angle of incidence of the wing and the angle of incidence of the stabilizer; X = the upward distance from the line of thrust to the wing center section = 1⅛"; G = the distance from the center of gravity to the center section of the wing = 1⅛"; T = the distance from the C. of G. to the line of thrust.

All of these values are known or can be established except the stabilizer area. The value of (Q) will be taken as (2) degrees, for the wing should be set at 2½ degrees angle of incidence and the stabilizer at (½)

(Continued on page 38)

C-D 3/4" AIR-ISTOCRATS

These Kits are super-complete—the very last word in beauty, realism and detail. Compared with competitive models they're the most underpriced Kits on the market, completed models considered.

No.	Name	Span In.	Price
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SF-13	Spad 13	19	2.65
SF-14	Fokker Triplane	17 5/8	2.50
SF-15	Fokker D-7 Fighter	21 1/4	2.95
SF-16	Albatroos Fighter	22	2.50
SF-17	Bayles Gee-Bee	17 1/8	1.95
SF-18	Howard "Pete"	15	1.25
SF-19	Supermarine S6-B	22 1/2	2.50
SF-20	Hawker Fury Fighter	22 1/4	2.65
SF-21	Hawk P6-E Fighter	32 5/8	3.25
SF-22	Macon Fighter	19 1/8	2.50
SF-23	Boeing P-26 Pursuit	30 3/8	2.50
SF-24	Lockheed Vega	30 3/4	3.25
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SF-26	Heath Parasol	23 1/8	.98
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SF-30	Nieuport 28 Fighter	20 3/4	2.50
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SF-32	Boeing 95 Mail	33 1/4	2.50
SF-33	Comper Swift Sport	18	1.25
SF-34	Fokker D-8 Fighter	30 3/4	2.50
SF-35	Boeing 247 Transport	55 5/8	8.50
SF-36	Lincoln Sportplane	18	.98
SF-37	Waco C Cabinplane	34 3/4	3.25
SF-38	Buhl Bull-Pup	22 1/2	1.75
SF-39	B-J Fighter	25 1/2	2.50
SF-40	Aeronca Sport	27	2.65
SF-41	Vought Corsair V-65	26 7/8	3.75
SF-42	Howard "Ike"	15 5/8	.98
SF-43	Douglas M-38 Obs	30 1/4	3.75
SF-44	Page's Racer	23 5/8	2.65
SF-45	Martin Bomber	80 1/8	8.50
SF-46	Laird Solution Racer	15 7/8	2.50
SF-47	'33 Wedell's W. Wns.	19 1/2	2.95
SF-48	'34 Turner's W. Wns.	19 1/2	2.95
SF-49	Curtiss P1C-2	29 5/8	3.75
SF-50	Curtiss Export Hawk	33 5/8	3.75
SF-52	"Mister Mulligan"	23 5/8	2.95

★ ★ ★ *If you're not a C-D modelbuilder yet, here's shot*

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We want *every* modelbuilder—both beginner and expert—to know the years-ahead value of C-D's. Hardly a day goes by that we don't hear from some modelbuilder who has just "discovered" C-D's and wonders why he's "been wasting all these years building ordinary models when it's so much more interesting and exciting, and, really less expensive, to build the real models C-D Kits make." We want you to buy a C-D right now—at our risk. (If your dealer can't supply you, order direct from us). Open the Kit and see the marvelous value you get, the super-detailed, easily-followed drawings that have set the pace in modelbuilding for years, the amazingly clean and clear fine-line printed wood, and the absolute completeness and splendid quality of everything else—*remember, though, that Dwarf and Rep Kits do not con-*

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C-D's a
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C-D's t
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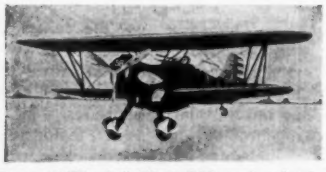
★ Cleveland-Designed Models Win More Prizes, More Honors th



Truest Model Yet Offered of the CURTISS ARMY HAWK P6E

Colored like Hawks in the 17th Pursuit group, yellow, olive drab, black and white. Our redesigned model is the most advanced type to be found anywhere. Often built by the best model builders when "first prize" is sought like our SF-49. Fast flights, Span 23⅝". Kit SF-21..... **3.25**

Unusual Power and Speed in this DOOLITTLE'S GEE-BEE RACER

The daring stubby design that took first place in Thompson Trophy Race of 1932. Major "Jimmy" Doolittle flew the course at an average of 252 M.P.H. which is still the Thompson "high" record. Make this unusual flying model. Span 18⅝": White with red scalloping. Kit SF-27 **2.50**

Kit Enables You to Build Either HOWARD "IKE" (OR "MIKE")

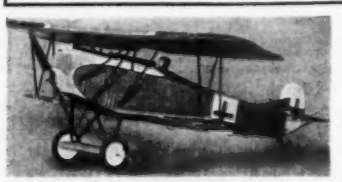
Our kit from which you may build either one, is easy to assemble into a beautiful decorative home ornament yet capable of interesting fast flights. Span 15⅝". All white. Kit SF-42..... **98c**

Another Convert to C-D's

Pride of the Pilots
BOEING 247 TRANSPORT

Span 55⅝". Wizard for flights. Powerful. High speed. Redesigned—with all curved wood printed out, "filled in" fuselage, balanced controls, etc. Grey colored. Four large 17"x44" panels of drawings, and data. Over 16 oz. of liquids, dope, cement, etc. Kit SF-35, postfree **8.50**

"I'll just give in and write this note: I'm a man with a family and have been in Ohio only a short time—but I picked up my hobby of model airplanes in California, our home state. Just recently I purchased a C-D Boeing 247 Transport from . . . It's my first C-D Kit. I have just completed the wing of this job—and as I sit here admiring it—I am prompted to let you know just how I feel about this Kit. It's the finest I have ever seen—and I've seen quite a few California Kits—I don't know where you get your balsa or the ink you use for printing—but it's wonderful—how clear and true to size. I make you this promise that the only Kits I'll have from now on will be Cleveland-Designed. Sometimes I put in about 200 hours on a model—and then give it to one of the neighborhood boys, or one of the boys in my troop of Boy Scouts—yes, I'm a Scoutmaster and this hobby of mine gives me something to talk about to the younger boys—in their own language. Please count on me as one of your big boosters, in the Youngstown district, and if I ever return to California, I'll certainly take plenty of C-D's along." Youngstown



Here's a 100% Authentic C-D Colored FOKKER D-7 FIGHTER

Used by German aces, it earned the reputation of most efficient fighter of the world war in actual service, being fast, maneuverable and could make long dives without shedding its wings. Redesigned model is 100% authentic, and beautifully colored, orange, green and white. Great flights. Kit SF-15..... **2.95**

★

EDITOR'S NOTE

No need, "Youngstown," we're now well represented in California — one of our best C-D states — you can buy them now through most of the better or up-to-the-minute dealers there.

★

Very High Scale Speed in this U. S. ARMY BOEING P26

One of the world's fastest pursuit planes. Developed along the lines of modern racers, it is capable of pursuit or light bombing work. Thrilling fast flights. Span 20⅝". Colored yellow and olive drab. Kit SF-23..... **2.50**

Most Accurate Model Designed of BAYLES' GEE-BEE RACER

This stubby little plane won the '31 Thompson trophy race. Had a very short fuselage which made it very maneuverable flying the pylons. Our model is redesigned and the most accurate model of its type on the market. Wing span 17⅛". Yellow and black. SF-17..... **1.95**

What's All The Shouting About?

Occasionally some model manufacturer will holler to high heaven that he "pays the postage." What a come on! Why Cleveland has been mailing "postfree" for 17 long years! We stopped talking about it years ago—but it continues nonetheless. Not only that—we always guarantee our line fully, and even guarantee 100% safe delivery (private insurance) when U. S. Parcel Post and the Express Co. is really responsible, for we want C-D customers fully satisfied —to keep them as C-D's friends.

MODEL BUILDERS! If your dealer hasn't or won't get the C-D's you want, accept no substitutes but order direct, sending check, or money order—cash at your own risk. No C.O.D.'s. Canada, Mexico, British Isles customers, add 10% to all prices—all other countries, 20%. Send 10c for America's largest model plane and supply catalog with the really largest assortment of gas model supplies, motors, other models, etc.—no free copies—worth 25c. Our 3c catalog no longer issued.

HOP ABOARD, MR. DEALER, WE'RE GOIN' TO TOWN

Dealer sales on C-D's are booming. If you're not handling this steady-repeat, business building line, you're missing the BIGGEST PROFIT opportunity in the whole field. Write at once for details. Clubs and Schools get our Club offer.

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Goi Wil
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WHRLW

We call "Black" most rub colored BUT bet of the repu mon "bl rubbers fo we have decided to boratory pared rubb because rubber really is We def formance model or la ANY re colored o

One foot stretches cates it as it stre both sid greater eff ness or weare ap three fa the great cating g of the pu to it, s smoothnes ing when ding tight of its p old rubbe make th ber outp for mode raft use.

ORDER SOME

7⅛ ft.	1/32x3/32
25 ft.	"
50 ft.	"
210 ft.	"
7⅛ ft.	1/32x⅛
25 ft.	"
50 ft.	"
210 ft.	"
7⅛ ft.	1/32x3/16
25 ft.	"
50 ft.	"
210 ft.	"

Add 10c for Postage on orders are ordered

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Flown by the Red Kn of the war. and white from other —and a Quick maneu and elimi of both the wings and mo 17⅝". Kit S

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lue of *ain any Liquids.* Once you make this simple examination, you'll immediately understand why "din- C-D's are the choice of expert modelbuilders the world over, and likewise the best training for models beginners. When you're building a C-D, you're building a real model—and you're buying e real C-D's today at prices much lower than a few years ago, due to improved features and greater dealer value today's C.-D's bring. Why waste the Fall and Winter months building ordinary models u get, when in many cases, for less money, you can be building the real "Air-istocrats" of the g for flying model world. Select your C-D today—don't wait—if you're not more than satisfied with ss and the value, return the Kit complete, well packed and—BACK GOES YOUR MONEY! Fair t con- enough isn't it? *Put us to the test—TODAY!*

C-D½" AIR-ISTOCRATS

These are precisely like the ¾" models—with a few minor exceptions. For coloring—we recommend the same colors as used on ¾" design of the same model. Remember DWARF Kits DO NOT CONTAIN ANY LIQUIDS, or STRIPING TAPE.

No.	Name	Span In.	Price
D- 1	Gr. L. Sport. Trainer	13 3/8	$ .65
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D- 8	Army Boeing P.1.-E	15	.65
D- 9	SE-5 (Scout. Expor.)	12 1/4	.40
D-11	A-W Quad Fighter	14	.50
D-12	Bishop's Nieuport	13 1/8	.50
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D-14	Fokker Triplane	11 3/4	.45
D-15	Fokker D-7 Fighter	14 1/8	.50
D-17	Bayle's '31 Gee-Bee	11 3/8	.50
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D-20	Hawker Fury Fighter	15	.65
D-21	Hawk F6-E Fighter	15 3/4	.75
D-23	Boeing P-26 Fighter	14 1/8	.65
D-24	Lockheed Vega	20 1/2	.65
D-26	Heath Parasol Sport	15 1/2	.35
D-27	Doolittle's Gee-Bee	13 1/8	.50
D-28	Monocoupe Sportplane	16	.65
D-29	Boeing F4B-3 Fighter	15	.65
D-32	Boeing 80 Mailplane	22 1/4	.65
D-33	Comper Swift Lightpl.	13	.65
D-34	Fokker D-8	15 5/8	.65
D-35	Boeing 247 Transport	30 7/8	2.50
D-36	Lincoln Sp.-rtplane	10	.75
D-37	Waco C Cabinplane	16 1/2	.75
D-40	Aeronca C-3 Sport	15	.65
D-41	Vought Corsair Fight.	18	.65
D-42	Howard "Ike" Racer	10 1/8	.25
D-43	Douglas O-38 Obs.	20	.65
D-45	Martin Bomber	33 3/8	2.50
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D-48	24 Turner's W. Wing	13	.50
D-49	Curtiss F11C-2	15 3/4	.65
D-50	Turkey Hawk	15 3/4	.65
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No low price models of any make can compare with these C-D Dwarfs.

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"C-D GRAY WHIRLWIND"

We call ... "Black" previously since most rub... colored is called "black." BUT bec... of the reputation of all com... mon "black" rubbers for model purposes, we have decided to call our special laboratory ...ared rubber "C-D Gray," because ... rubber in its pure state really is. We defy comparable performance ...odel or laboratory tests with ANY ru... colored or otherwise.

One foot ... stretches ten feet and lubricates itself ... it stretches! Smooth on both sides ... greater efficiency (no rough... ness or ... wave appearance). These three fac... the great stretch, the lubricating ef... of the preparation applied to it, and ... smoothness to prevent chafing when ... tightly, to say nothing of its ... solid rubber characteristics—make this ... outperform any other for model ... craft use.

ORDER SOME AT ONCE

7½ ft.	1/32x3/32 flat	$ .03
25 ft.	"	.09
50 ft.	"	.17
210 ft.	"	.60
7½ ft.	1/32x1/8 flat	.04
25 ft.	"	.12
50 ft.	"	.22
210 ft.	"	.85
7½ ft.	1/32x3/16 flat	.05
25 ft.	"	.16
50 ft.	"	.30
210 ft.	"	1.10

Add 10c for Packing Charge, unless ... are ordered also.

This ... ber gives a steady flow of power—... common "burst" at the start and ... with most rubbers.

Germ... Praise this Realistic
N RICHTHOFEN'S "TRIPE"

... by the ... Red Knight before the close ... brilliant red with silver nose ... white ..., it was easily distinguished ... other "..."—and avoided by opponents. ... and climb were characteristic ... the ... and model. Span ... 2.50

Kit ...

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CURTISS F11C-2 (GOSHAWK)

Designed for advanced model builders who want a thoroughly detailed scale model and one which, when completed, represents the acme of perfection in model building. Span 23⅝". Silver, yellow, gray and green.
Kit SF-49..... **3.75**

Performance Is Built Right In This
U. S. ARMY BOEING P12-E

Maneuverability, speed, fast climb. Model gaily colored like real P12-E with red trimmings, yellow wings, tail and stripes. Olive drab fuselage, also color striped. Span 22½". Kit SF-8 **2.85**

Army Model Builders are Strong for
U. S. ARMY MARTIN BOMBER

Fastest service bomber in the world. Span 53". Colored U. S. Army yellow, olive drab, black details. Marvelous landing gear (not retractable). Turned balsa invisible hub wheels. Printed out wood. A masterpiece of detail and beauty. If sold more than 5 years ago, would command at least $20.00.
Kit SF-45, postfree..... **8.50**

If You Want Prizes, Build Prize-Winners!

A Hit Model In Every Contest
DOUGLAS U-38 OBSERV.

Very beautiful and unusually well detailed model. Authentic only as "Cleveland" makes 'em! Span 30", length 22¾", weight 4.8 oz. Yellow, olive drab, black details, 2 pilot blocks.
Kit SF-43..... **3.75**

"A few weeks ago I entered two of my C-D models in an exhibition in San Francisco, a Douglas 0-38 and a Hawker Fury, and won first prize in all the seventh grades in San Francisco. A technical school was represented with three C-D's (two dwarf kits and one ¾ scale), so if they're good enough for them, they're good enough for me! "C-D'S" for me from now on!" SAN FRANCISCO.

Prizes Are Consistently Won With
MONOCOUPE SPORTPLANE

Two place monoplane also used for pylon, cross country racing and stunting. Found at nearly every airport. Easy to build, a good flier and very attractive. A "first prize" winner everywhere. Span 24". Cream and orange.
Kit SF-28..... **2.50**

You May Never Again Get Such a Bargain In C-D

DRAWINGS

Fifty-five (55) authentic ⅛" scale solid model drawings—
Three authentic 3/16" solid model drawings.
Twelve (12) authentic ¾" scale flying model drawings (including such famous planes as Doolittle's Gee-Bee, Vought Corsair, Comper Swift, Aeronca C-3)—
Two (2) authentic ¾" scale flying models, including Lindbergh's Lockheed Sirius—
In all—72 highly prized C-D drawings, a buy that may never be duplicated again. Limited supply—so act at once—order today.
$15.80 Value for only..... **1.50**

No Smarter Model Anywhere Than This
GREAT LAKES SPORT TRAINER

An attraction wherever displayed with its interesting swept-back wings similar to modern dive bombers. Model has good flying qualities. Span 20", colored orange and cream.
Kit SF-1..... **2.65**

Use C-D Supplies For Building Better Models! The Wise Ones Do.

This Catalog Should Be In the Hands of All

MODELMAKERS & CRAFTSMEN

Here's the most complete Modelmaking and "Practical Hobby" catalog ever produced—bursting at the seams with information and hard-to-get items at regular advertised prices! Includes not only more than 100 C-D Model Airplane Kits and thousands of Gas Model and other Supplies, but Railroad and Ship Models, Yachts, Engines, Lumber, Miniature Mill Supplies, hard-to-get Fittings, Machinery, etc., etc. No enthusiast should ever be without it. Send 10c now for your copy. Supplement free later on.

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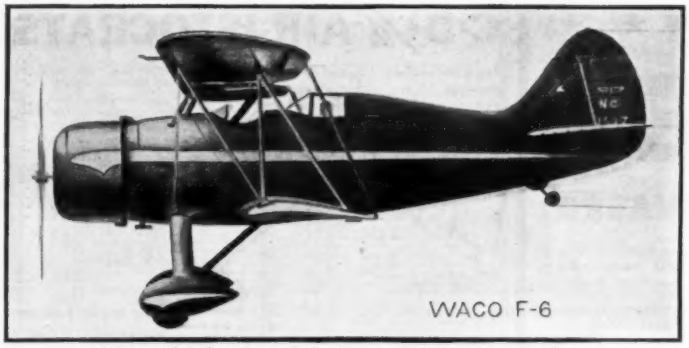


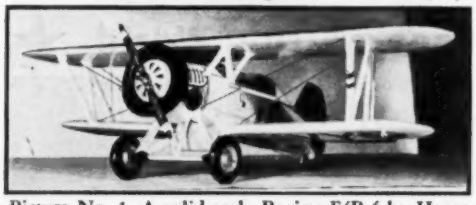
A beautiful drawing of the Waco F-6, By Wm. Drake

AIR WAYS

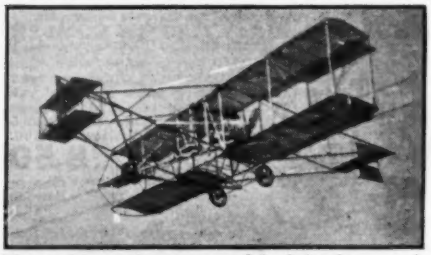
HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Send Pictures and Details of Your Experiments

Air Ways Club News



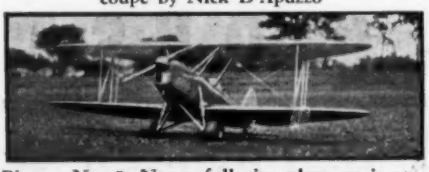
Picture No. 1. A solid scale Boeing F4B-4 by Henry Frauenthal. This photo is one of the best received.



Picture No. 2. An exact model of the first speed race winner, an old Curtiss Pusher by Christy Magrath, Jr.

Picture No. 14. Builders busy themselves in a workshop in Amsterdam, Holland

Picture No. 3. Here is a real flying scale Monocoupe by Nick D'Apuzzo



Picture No. 8. Not a full size plane as it appears, but just a very fine model by J. H. Livingston, 3rd

BECAUSE of the fact that we find it necessary to go to press with the October issue before August 21st, the date of the closing of the Air Ways Club Design Contest, it will be impossible to give the results of the contest in this issue. They will appear in the November issue.

Those who have not received membership cards but who have made application for them, will receive them as soon as possible.

We have interesting news from various sections of the United States and foreign lands this month. To start off with, we call your attention to the heading of the Waco F-6, which has been submitted by William Drake of 3 Pine Street, Malden, Mass. Mr. Drake is becoming one of our leading artists.

Mr. Henry L. Frauenthal of the Office of the County Engineer, Mineola, New York, favors us with one of the finest pictures we have received, showing his solid scale Boeing F4B-4. It is shown in picture No. 1. Mr. Frauenthal has come to the realization of a very important fact, that it is as hard to take a good photograph as it is to build a model. He writes:

"In my experience, I have found it just as difficult to photograph the model properly, as to construct it. It was necessary for me to make about 36 trial exposures, noting at the same time data as to shutter speed, lighting, background, shadows, diaphram size and distance. Then by comparing each set of data with its corresponding printed photo, I was able to determine just what set of conditions was most suitable to any particular plane's color scheme. So you see I went at it quite scientifically. Rest assured I got plenty of over and under exposed prints before I deduced the correct conditions. Should any of your readers be interested, I found in using a No. 116 Collapsible Kodak and Plenachrome Agfa film, that the following data, in general, produces quite satisfactory results:

Exposure: 4 secs. for Navy colors; 5 sec. for Army.

Background: Silver mat.

Light: 2-photoflood bulbs on either side of camera. Diaphram: No. 32 stop.

"I will be glad to assist any of you readers through correspondence, who wish to photograph their models."

Many readers may find it helpful to get in touch with Mr. Frauenthal. The model itself has been very carefully constructed, as you can see. It is made to a scale of ¼" to a foot.

We have quite a treat for our Air Ways readers, for which we are indebted to Mr. Christy C. Magrath Jr., of 2317 Randolph Street, St. Louis, Missouri. He submits picture No. 2 which shows an exact scale model of the old Curtiss pusher. This ship held the first speed record established at Rheims, France, in August 1909, by flying at the rate of 56½ miles per hour. The model is made of metal, silk and bamboo. The brake rods were made on a jeweler's lathe, as were parts of the eight cylinder detail motor. Mr. Magrath has some remarks which may be of great interest to you. They are as follows:

"I started building models when I was quite small, back in 1917, and have been at it ever since. While flying models is a hobby with me, I make a fair living building historical models for pilots, aviation companies, museums, etc. I've built everything from the Ling Wu kite glider of 457 B. C. to the 1936 Curtiss model R. Among my customers are Mr. Ralph S. Damon of American Airlines, Jimmy Doolittle, Jimmy Haizlip and members of the 94th and 95th

Picture No. 10. A model glider in flight in Netherland East Indies by J. S. Sigmond

Picture No. 6. A speed model (Miss Miami) by Wm. Heermance. It resembles a breed of fish.

World War Aero Squadrons.

"I've spent much time and money gathering authentic data from all over the world and my files are priceless. They include a rare copy of Wise's 'History and Practise of Aeronautics', published in 1850; Chanute's 'Progress in Flying Machines', (1894); Langley's 'Experiments in Aerodynamics', (1893), and many others. I am not a collector of books unless practical information can be derived from the age-old pages.

"John Wise flew air mail from St. Louis to New York in 1859 and his book more than paid for itself by giving me the dope on Garnerin's parachute, one of the photo subjects. I also found a new copy of Jane's 'All the World's Aircraft' for 1919 which in itself is priceless. I am constantly looking for copies of 'Aero' and 'Aeronautics' weekly aviation magazines now long out of print. My drawings contain such rare ones as the true Bleriot 1909 Channel ship, Lincoln Beachey's upside-down biplane of 1913, the famous Heinrich monoplane of Baldwin, Long Island; Captain Baldwin's 'Red Devil', a set of Spad drawings from M. Bleriot himself and many others, all of which have been or will be put to practical use."

Picture No. 3 shows a neat little flying scale Monocoupe built by Nick D'Apuzzo of 32 St. Marks Place, Brooklyn, New York. Though this ship looks very much like a solid scale model because it has been so well constructed, it flies exceedingly well.

At the 1936 Indoor Nationals, Alvie Dague, Jr. of 1106 North Denver, Tulsa, Oklahoma, won the Bloomingdale Trophy which was awarded for the best duration for indoor fuselage models. Picture No. 4 shows Dague's winning model and the permanent trophy which he received with the large trophy. The large trophy is passed on to the next winner of this event. The model has 148 square inches of wing area and is of fairly heavy construction due to the weight of wood available when he built it. The prop is sixteen inches in diameter and has an average speed of about ninety revolutions per minute. Dague says that he has found the model to be a very consistent flier.

On the winning flight of sixteen minutes, seventeen seconds, he had 1600 turns in the motor which was about right for the height of the Olympia Stadium in Detroit. The ship climbed for about eight or nine minutes and reached a point within a few feet of the top rafters. He was very lucky in that the ship stayed in the center of the building and did not hang on any of the wires which were too plentiful for comfort. However, when the model was about half-way down, it collided with another ship and then proceeded to spin down. Eventually they came apart.

Dague very graciously says that he does not believe the loss of time on his flight was of great significance. Unquestionably the flight would have been longer if this had not occurred. We appreciate Dague's contribution.

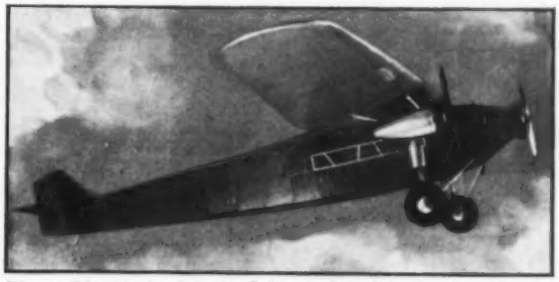
Many readers complain that flight pictures are hard if not impossible to get. Picture No. 5 at least disproves the fact that they are impossible to get. Apparently it requires a little clear thinking and patience. A little agility will also help considerably, especially if the model should put on speed and make a dive for the camera. The picture shows a Taube-like design monoplane which was designed by Carlyle Linski. The very excellent photography and the one to whom we are indebted for sending this picture is Mr. Burnell R. Brown of 2423 Alaska Avenue, Dallas, Texas. Mr. Brown says that the ship is a very consistent flier, making flights of one to two minutes. Mr. Brown says in his letter:

"These pictures of models in flight were taken myself with the invaluable aid of a finder, that I designed and made, on the camera. Out of twelve snaps I got twelve pictures with the models smack in the center of the photo. No self-respecting model builder wants a picture of just sky, so if you have any demands for a finder of this type, drop me a line and I will send you the details of it. The cost of constructing it is nil."

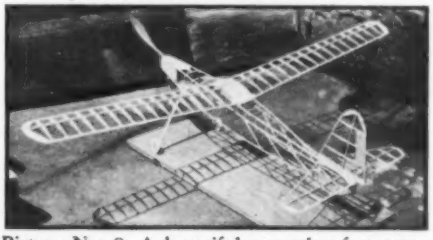
We wish to express our appreciation to Mr. Brown for his sentiments.

Now take a look at picture No. 6. When we first received this

(Continued on page 45)

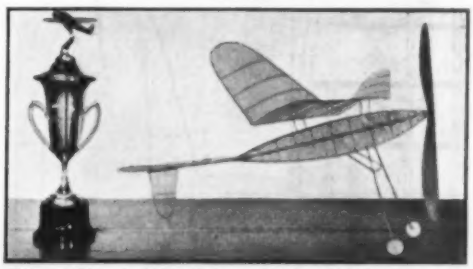


Picture No. 11. A tri-motor flying model of the Southern Cross, made by Ken. Moore of Australia



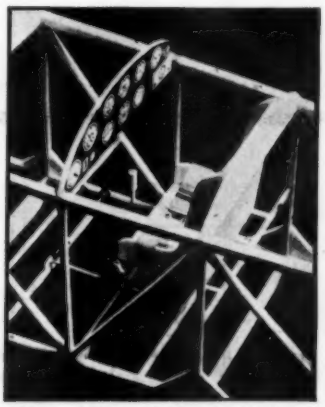
Picture No. 9. A beautiful example of contest model construction by Len Scott of England

Picture No. 12. French model builders get together for a contest held by the Ligue Aeronautique De France



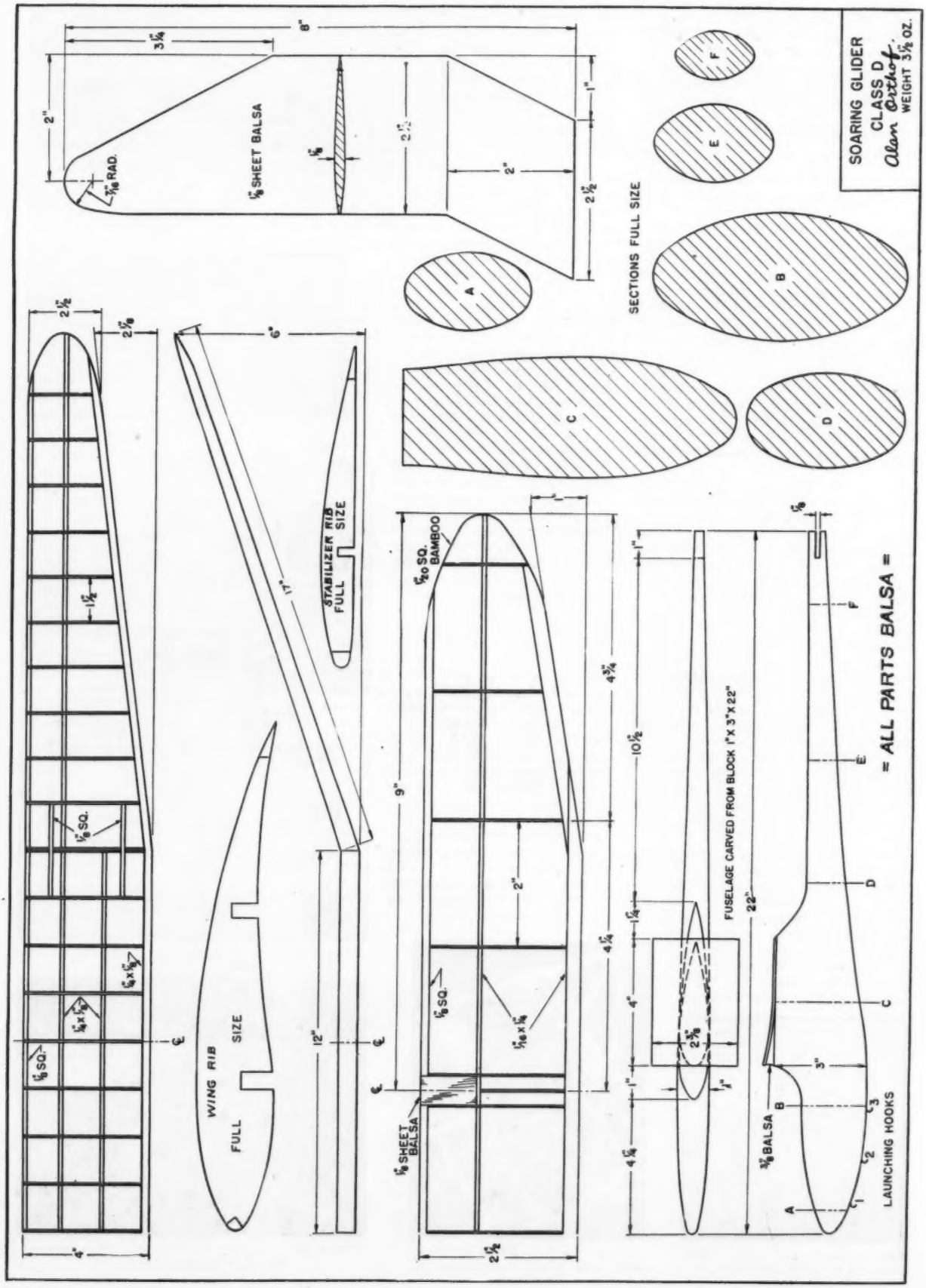
Picture No. 4. Alvie Dague, Jr.'s model that won the 1936 Bloomingdale Trophy

Picture No. 5. An actual flight photo of a Taube model by Burnell Brown



Picture No. 7. A fine example of real scale model construction by Bert Sloane

Picture No. 13. Model builders also inhabit Sweden. Here is a group at Stockholm


SOARING GLIDER
CLASS D
Alan Arthur
WEIGHT 3½ OZ.
8"
3¾"
2"
⅛" RAD.
⅛" SHEET BALSA
⅛"
2½"
2"
1"
2½"
SECTIONS FULL SIZE
A
B
C
D
E
F
2½"
2⅛"
1½"
⅛" SQ.
¼"x¼"
⅛"x⅛"
4"
WING RIB
FULL SIZE
6"
17"
STABILIZER RIB
FULL SIZE
12"
⅛" SQ. BAMBOO
9"
2"
⅛" SQ.
⅛"x⅛"
⅛" SHEET BALSA
2½"
4¾"
4¼"
10½"
1"
4"
2⅜"
FUSELAGE CARVED FROM BLOCK 1"X 3"X 22"
22"
⅛" BALSA
3"
LAUNCHING HOOKS
= ALL PARTS BALSA =

We Hear—

The Avro "Anson," new British Coast Patrol plane. (Courtesy of "Flight")

ONE hundred seventy-four Avro "Ansons," military version of the 652 commercial monoplane, are to be used by the R.A.F. for coastal patrol work.

This machine is interesting as the only example of a modern British service aircraft (with the exception of training machines) with wood in the structure. The Anson's wing consists of two spruce and plywood box-spars with wooden ribs, fabric-covered, and the fuselage is of welded steel tube—standard Avro monoplane practice. There is a fixed gun for the pilot and a "parrot-cage" gun-turret houses the observer. Stowage in the wing for eight 20 pound bombs and two 100 pound bombs.

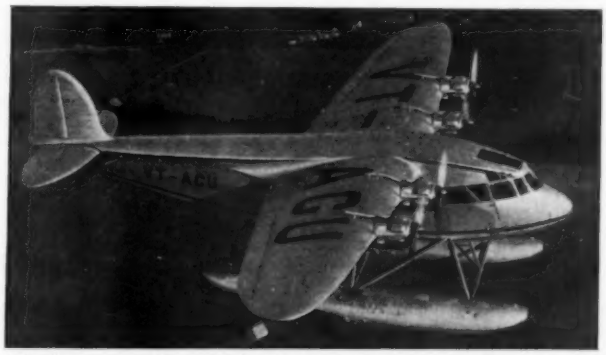
The "Anson" is very maneuverable for a machine of its type. Last month, you commented that the speed was low compared with American civil types. Perhaps—but what do you expect with military factors and a total hp. of only 480?

A new transport of a type that you seldom see in America—the medium-sized, low-powered machine for the operator who has to pay his own way.

The Short "Scion Senior" is a high-wing cantilever monoplane with four Pobjoy "Niagara" radials of 90 h.p. each. On this modest power expenditure, it carries a pilot and ten passengers at a maximum speed of 140 m.p.h. for the landplane and 134 m.p.h. for the seaplane. Rather low speed, according to American ideas, but low operating costs—fuel consumption is only 18 gallons per hour.

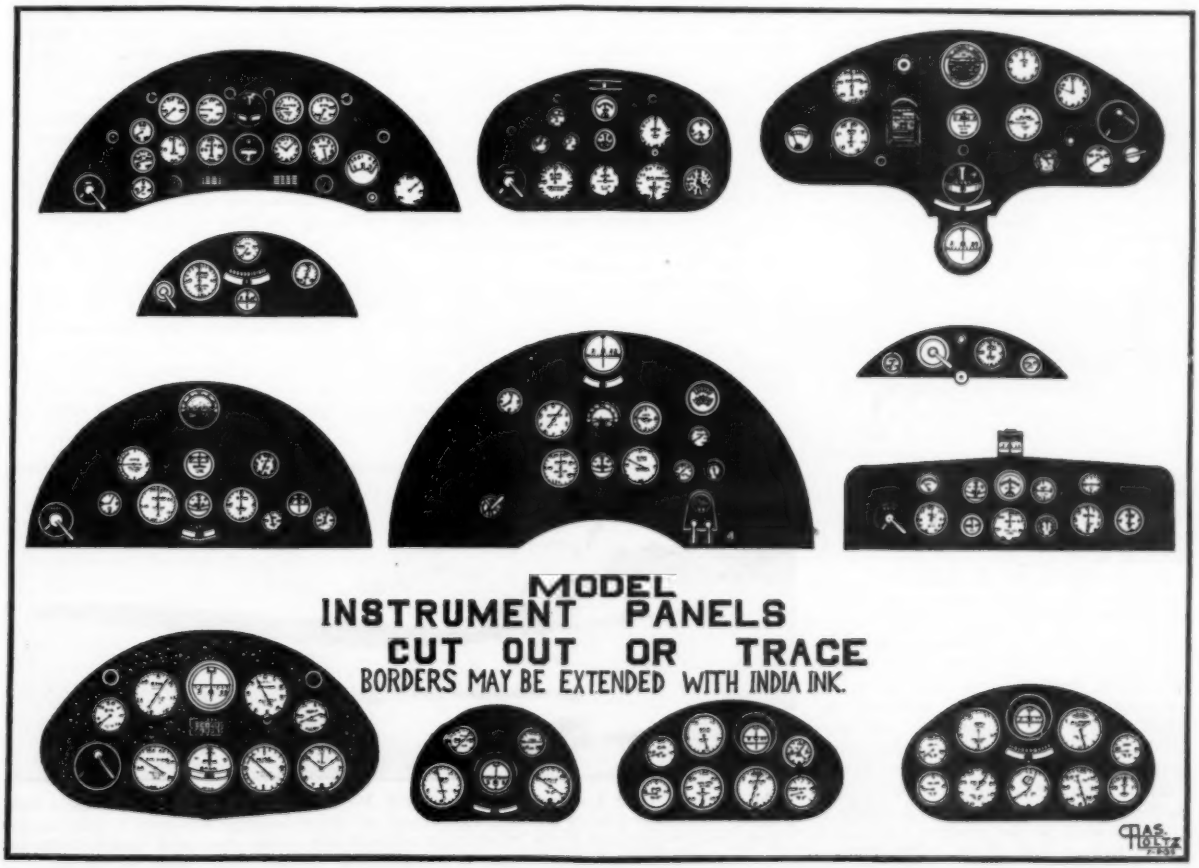
The "Scion Senior" has a service ceiling, with one engine cut out, of 6,500 feet, and height is just maintained low down with two engines out. The cabin is very roomy—average width, 4 feet, 6 inches, mean height 5 feet.

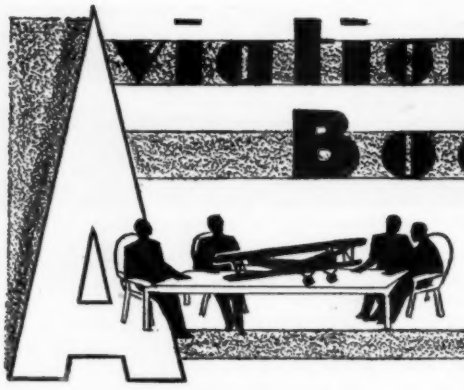
Structure is all-metal, with fabric covering; welded steel tube fuselage and wing with single spar built up of extruded duralumin flanges and tubular bracing members.



The four motor Short "Scion Senior." It carries ten passengers at 140 M.P.H. with 360 hp. on 18 gal. of gas per hour. (Courtesy of "Flight")

Hawker's are producing a new low-wing cabin mono fighter. Variable-pitch airscrew and retractable undercart. All-metal. Engine, Rolls-Royce "Merlin," but hp. and speed are official secrets.





Aviation Advisory Board

Conducted by
CHARLES HAMPSON GRANT
Chairman of the Board
Formerly of
The Technical Section, Air Service, U.S. Army

MANY readers have asked questions concerning the design of model planes. It is possible that problems in gas model design have prompted these. The questions that follow are typical of those received from a number of our readers. Some of these readers are: M. B. Elton of 811½ 8 Street, Bremerton, Washington; Paul Paulsen Jr., of 153 Union Street, Randolph, Mass.; Richard Scott of 458 Cleveland Avenue, Trenton, New Jersey; George De La Mater of 405 Chestnut Street, Oneonta, New York. It would be well for designers to read this column carefully this month, as possibly they may find the answer to some question which may be puzzling them.

Question: What is meant by stabilizer moment arm?

Answer: Stabilizer moment arm is the distance from the center of reaction of the stabilizer to the center of gravity. Usually this distance is taken from the center of the wing to the center of the stabilizer. The moment arm length is the measure of the leverage that the stabilizer exerts to right the ship when it assumes an unnatural flight position.

Question: What is meant by directional center?

Answer: The directional center is the center of lateral projected area of the airplane, just as the center of gravity is the center of weight of the airplane.

Question: How do you find the actual directional center?

Answer: A silhouette of the side view of the airplane should be made. If the wing is dihedralled, the wing tips will be raised and a certain portion will show up as lateral projected area. Actually the projected area or shadow of the wings alone in the silhouette pattern should be enlarged to double its area because of the fact that there are two wings, each one of which has a vertical projection when it is dihedralled.

The same must be done with the wheels so that on the actual pattern of the silhouette, which should be finally cut out from some piece of cardboard, the projected area of the wings and wheels should be double. This will give you very accurate results. If, however, approximate results are sufficient, the area of the wings and wheels need not be increased in the silhouette pattern, as one balances the other approximately. The pattern will then give the appearance of the side view of the airplane. The center of lateral area of this silhouette pattern may be found by suspending it by means of a thread. This may be done by tying a thread to a pin and sticking the pin in the pattern perpendicular to its surface at various points until a point has been found at which the pattern assumes a horizontal position. This point is the directional center.

Another method of finding the directional center is by taking moments of each *sectional area* of the pattern about the point of the nose of the airplane. This is accomplished in the same manner in which the center of gravity is determined, only instead of weights, areas are used in the compilations. A description of how to find the center of gravity will be found in the November 1933 issue of MODEL AIRPLANE NEWS. This may be used as an example.

Question: What is meant by the longitudinal center of rubber motors?

Answer: Probably what the question means is: "What is meant by the center line of the rubber motor?" The center line of the motor is the axis which extends from one end of the motor to the other. Extended, it passes through the propeller shaft in the front and through the center of the motor hook at the rear.

Question: Is there a set rule to find the correct fuselage length in respect to the other parts of the plane?

Answer: There is no set rule for such a proportion, inasmuch as the length of the fuselage is dependent upon many factors or combination of factors. However, all these factors are usually within certain limits of value. Therefore, a *general* rule may be taken which will give good results.

That part of the fuselage from the rear wing should be about half the wing span. The length of the fuselage from the wing forward to the nose is dependent upon the type of plane. In planes with landing gears, this distance is from one-quarter to one-third the total length of the fuselage; in other words, one-sixth to one-quarter the wing span. In models without landing gears, the distance from the wing forward to the nose is from one-third to one-half the wing span. The rear part in all these cases should be half the span, as mentioned above.

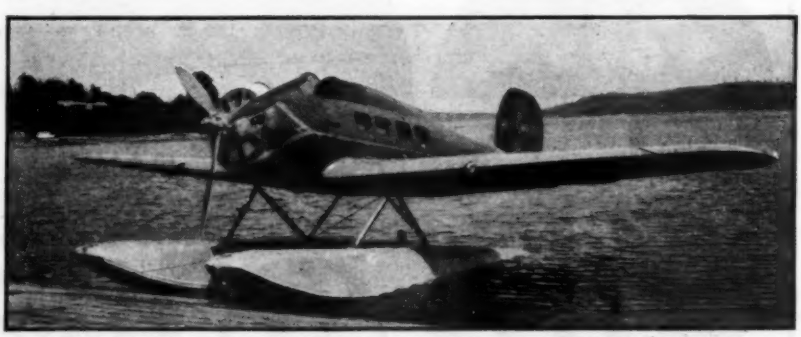
Question: How do you determine angular difference between the wing and stabilizer?

Answer: In almost all cases the difference in angle between the wing and the stabilizer (longitudinal dihedral) is approximately two degrees; that is, the wing incidence is two degrees greater than the stabilizer incidence, when flat or streamline section stabilizers are used.

Question: Is it possible to use the high line of thrust principle on a twin pusher?

Answer: Yes, it is possible to do this. In such a case, the line of thrust should be approximately on the line with the center section of the wings. In order to obtain the low center of gravity relative to the line of thrust which this question infers, the frame must be tilted downward toward the nose. The rubber motors may be attached to the nose of this frame so that they run parallel to the sticks to the rear thrust bearings. At the rear end of the sticks, the propellers will be mounted. The rear end of the stick thus will be on a level with the

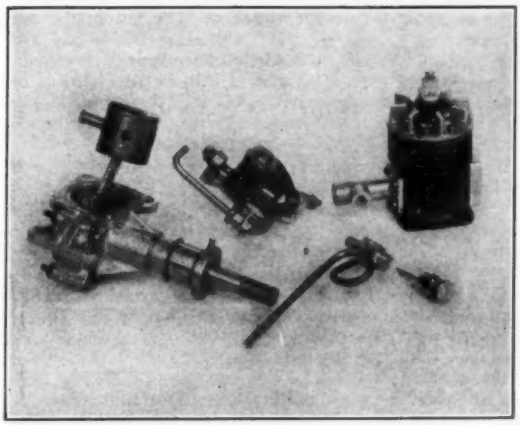
(Continued on page 48)



The specially built Lockheed in which Will Rogers and Wiley Post made their fatal flight. It is known as an Orion-Sirius because an Orion fuselage was used in combination with Sirius wings and floats in order to obtain large cabin space and qualifications for water takeoffs and landings. It was powered with a P & W Wasp of 550 hp.

G. H. Q. GAS ENGINES

AN ENGINEERING TRIUMPH .... *never before at so low a price!*



Indeed an engineering triumph—accomplished by outstanding G. H. Q. designers and engineers, who have constructed into the G. H. Q. motor everything that years of exhaustive scientific aerodynamic research could produce—geared to the highest possible degree of perfection. But more than that, the acid test . . . an overwhelming response. Thousands of letters are pouring in from all parts of the country praising, recommending, and endorsing this scientific achievement. It seems as if everyone in America wants one. The most hair-raising thrill you've ever experienced will be yours with the G. H. Q. motor—actually one of the most powerful motors ever constructed. Has broken records for amazing performance . . . and just imagine—flies model planes up to 10 ft. wingspread. Also used for boats and stationary use. Easy to start and simple as ABC to assemble—average assembly time is only 45 minutes. So easy only a screw driver is needed.

Everything is in the kit including plug, coil, condenser, tank, ignition wire, cylinder, piston, connecting rod, timer, crankshaft, all screws, nuts, bolts, etc. Every part is fully machined and finished. No oil, gas, batteries or propeller included. Postpaid for only.....

$8.50

AND THESE FEATURES MAKE THE G. H. Q. MOTOR A WINNER!

1. Easy starting—just a twist of the wrist.
2. Steady running—as long as gas, oil and spark are supplied.
3. Motor cannot overheat.
4. Precision parts.
5. All parts replaceable.
6. Cylinder and piston lapped to within .0003.
7. Accurate die castings.
8. Crank shaft balanced and perfectly machined.
9. A light spark coil that is oil, water and gas proof.
10. Coil will not overheat or short circuit.
11. Main bearing is high-speed bronze, ground and lapped to size.
12. Condenser is gas, oil and water proof.
13. Cylinder and piston inspected cast iron to insure long life.
14. Chrome nickel steel shaft with 1⅛" bearing surface.
15. Connecting rod of high speed bronze.
16. Carburetor and assembly accurately designed and made.
17. Needle valve and valve body machined together.
18. Breaker assembly compact, foolproof, long wearing, replaceable and adjustable.
19. Easily inverted and runs in either direction.
20. Motor starts and runs on 2 ounce battery.
21. Speed range 500 to 10,000 R.P.M.
22. Low gas consumption—runs 27 minutes on one ounce of gas.
23. Strongest miniature motor.
24. LOWEST PRICE EVER SET.

MAKE BIG MONEY

Here is your opportunity to make money quickly, easily by assembling G. H. Q. Motors. All you do is send your order for kit of parts—assemble it (average assembly time is 45 minutes)—and sell as a Ready-to-Run G. H. Q. Engine. Our national advertising makes that easy. And think of all the fun while you are making the money! Send for your kit today.

GAS MOTOR ACCESSORIES

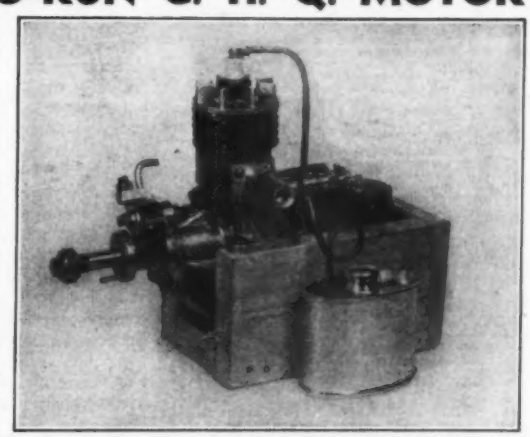
Spark Coil (Non-overheating)	$1.50
Spark Plug (24-⅜")	.75
Condenser	.10
Wheels Hubs (⅛" I.D.) per pair	.50
Propeller	1.50
Flywheel	1.50
Battery (special 2 oz. 4½ V.)	.50
Gas Tank (1 oz. streamlined)	.50
Midget Switches	.35
Propeller Blanks, 14" diameter, 8" pitch	.25
Engine Instruction and Assembly Booklet	.10
Bamboo Paper, 2 sheets for	.15
Silk (special for gas jobs), sq. yd.	.45

READY-TO-RUN G. H. Q. MOTOR

The famous G. H. Q. motor, entirely assembled on stand. Tested and run before shipment—Performance guaranteed—1/5 horsepower at 3000 to 7000 R.P.M.—No oil, gas or batteries included. Postpaid for only

$12.50

FREE with every finished motor, 1 finished flywheel mounted on motor. This offer not for dealers.



HERE IS NEWEST G. H. Q. SENSATION!

The G. H. Q. Sportster kit especially designed for G. H. Q. Gasoline motor but may be used for any other motor of like weight and power. Built according to scientific aerodynamic principles—Has made hundreds of successful flights without crackup—Marvelous glider . . . And what a climber!

A complete kit of all parts including plan, all wood, wire, wheels, metal and all other parts. Postpaid for only **$5.00**

A GUARANTEE

G.H.Q. Machinists have successfully constructed hundreds of finished motors from the kit without having any motors which did not operate satisfactorily. For this reason we feel safe in making this guarantee—that should an exception arise, purchaser may return parts to us with $4.50 (charge for assembling and postage) plus cost of any damaged part. Finished motor will be returned in few days.

Order today or send 3c for illustrated catalog of gasoline motors, gasoline planes, gasoline accessories and parts, as well as all other G.H.Q. Kits.

DEALERS WRITE!

G. H. Q. MODEL AIRPLANE CO.

564 Southern Boulevard
NEW YORK, N. Y.

WHITFIELD'S
JAPANESE TISSUE
AA In 32 Colors AA

BAM-BOO TISSUE
JAP-FIBRE paper superior to silk for GASOLINE POWERED MODELS. Weight and strength properly proportioned. Natural shade.

REFERENCE FROM THE WINNER OF ONE OF OUR CUPS:
"Thank you for the beautiful trophy I received at Detroit, Michigan. I used your BAMBOO PAPER as covering for the model. In my opinion it makes the strongest covering and most economical covering for gas models.
I have been using your paper for past two years and have found it to be far superior to any other paper I have used, and I would not hesitate to recommend it to anyone.—YATES MODEL AIRPLANE SHOP, MELVIN H. YATES."

FEATHER PAL-O-WINA

BROADE BLADE

A NEW PROPELLER! 50% More Efficient!

(Illustrated on right) Will develop speed that will astonish you! A big jump towards perfection in flying models! New . . . and specially designed for Whitfield. Made by our expert carvers in Japan. Handmade, finished natural, highly polished, drilled with hole. Sample 15 cents.

Our close connection with Japanese makers of propellers eliminates fancy prices and makes it possible for dealers to equip their models with Pal-O-Wina props. We carefully watch quality and only import props that we have found practical.

Reference from a large organization. Established many years in New York State:

"By actual test we have found the recent shipment of high speed Broad Blade Props, highly efficient, developing 50% more speed."

MINIATURE CELLULOID MOTORS
4 sizes: 1½ in.; 2 in.; 2½ in.; 3 in.
Another Japanese Import

These lightweight motors have been designed to our specifications. Every detail of the original radial engine has been accurately reproduced even to the cowl plate at the front. They are a distinct improvement over any other dummy motor. At Whitfield's low price, they can be easily included in every flying model kit.

Send for Sample Motor or propeller with prices 10c

We Pay Shipping Charges
WHITFIELD PAPER WORKS
12 VESTRY ST. NEW YORK CITY
Established 1869

Building the T-D Coupe

(Continued from page 11)

attached to the tubing. Loop the ends of the wire fork to form a hole for the axle.

The wheel is 1¼" in diameter and can be made from a sponge rubber ball.

The battery and coil mount is shown in detail No. 3. This is only suggested and may be altered to suit your own particular desire. It is made entirely of 3/16" medium hard balsa. Since the batteries are held in place by rubber bands, cement three hooks made of No. 12 piano wire to each side of the box. Two hooks will be needed for the coil (one will be on the spruce brace on the bottom of the fuselage). Cement all hooks firmly and wrap with thread. Now cement the box in the bottom of the fuselage.

Cowling

Since your motor is air-cooled, the cowling should be used for scale purposes and not for flying. The cowling can be made either of aluminum or balsa wood. The spark plug and needle valve will protrude and the exhaust manifold should be removed. The cowling can be held in place by using dress-snaps.

Motor Mount

The motor mount for the Baby Cyclone is shown in detail No. 1. Although not entirely necessary, it should be made so that the motor will pull ½ degree down and to the right. The rear plate is made of 1/16" aluminum and can be reënforced by bolting angle aluminum on the back. DO NOT use heavier aluminum for the mount itself. It is much easier to straighten or replace a few aluminum pieces than it is to repair a fuselage or buy new parts for the motor. Bend and drill all pieces as shown. It will be necessary to file the horizontal pieces in order to fit the crankcase of the motor. Use 4-40 brass bolts and lockwashers to assemble the motor mount. Note the position of the tank and condenser. The mount for these should be cut from the wood mount the motor was on when it reached you. Attach the motor mount to the horizontal spruce pieces by using ⅜" No. 0 wood screws.

Using either clips or soldered joints, put in your medium-sized batteries, coil, external switch, external booster connections, and wire your entire job. Keep the spark wire away from the motor mount. An automatic timer can be used to open your switch if desired. You may have a little trouble at first reaching or replacing the batteries and coil when your model is covered, but this should not prove difficult.

Covering

See that the wings and tail are perfectly true and not warped in the slightest. If they are, either straighten or rebuild. Using a good grade of silk with thinned out cement as an adhesive, cover the tail first, then the wings and then the fuselage. Tighten the silk by spraying with water and then hold near a fire to dry.

Dope the entire model with two coats of clear dope, and finish up with two or more coats of colored dope or lacquer. Although the color scheme on the original model was metallic (half silver and black) and yellow, any suitable color scheme may be used.

Assembly

Place the stabilizer on the rear of the fuselage and slide the rudder into the tubing. Attach the front of the rudder to the adjustment plate with a long 4-40 bolt. Use a nut and a lockwasher for adjustment. Use a few drops of cement on the tail assembly to prevent vibration. The tail braces are made of 3/16" aluminum tubing and are held in place with cotter keys of aluminum wire. The wing is held in place with a 10 foot piece of ⅛" FRESH rubber. Use a pine or spruce propeller with a diameter of about 13¼" and a pitch of 8½".

Test Flying

Balance the model at a point slightly behind the front spar of the wing. Set the rudder in neutral position. Take it out to the nearest airport and put between 1 and 2 eyedroppers of gasoline in the tank. Start the motor, adjust, and let the model take off into the wind, if any. Notice every action the model makes.

A few test flights should suffice in finding the correct balance. If the directions and plans have been carefully followed, you will be rewarded by not only a nice-looking model, but a beautiful, fast flier.

Navi-Goid

(Continued from page 21)

nected her headphones and the uniformed guard at the door nodded in approval.

"Hauptmann, have there been any reports from the *Dortmund?*"

"*Nein,* Herr Kommandant," he replied. "There has been no word. It is serious, indeed. *Acht,* I am not sure just what to do."

"Would you consider action?" Wöller inquired.

"The time has arrived," Schlesmann acquiesced readily, "Have I your release?"

There was an instant's hesitation.

"*Ja* . . . conditionally, of course. I must have periodic reports. I must be informed of your every act. That is all."

Schlesmann dropped the received on the hook hastily.

"Wasser!" he barked.

A soldier burst into the room, regained his stance with automatic precision, and saluted. "*Ich kuntig?*"

"Go at once to the radio room and ascertain which steamships are in the Cape Verde-Cape S. Roque seas. Obtain wind velocity and direction readings. Remember! The readings must be accurate and as complete as possible!"

"*Jawohl,* Herr Hauptmann."

The soldier vanished with inspired haste. The captain raided the drawers of his desk until he found a box of pencils and a thick bundle of blank sheets of paper.

"Strass," he called, as he opened the door to leave, "tell Goebel, Eschfield, Buckenbach, Weir and Köppen to meet me upstairs in room *sieben* at once." With that he was gone.

* * * *

James Mathews dug his fingers deeper into the fabric seam and raised his head to examine the surrounding seas. The clouds obscured the moon, permitting only a faint glow and an occasional direct beam to illuminate the darkness.

"CALIFORNIA CHIEF" KIT
+ "BABY CYCLONE" ENGINE
+ SPECIAL RACING PROP
for $21.50 prepaid

Because of the demand, Aircraft Industries is repeating its sensational offer of $21.50 for the "Baby Cyclone" engine, the proven "California Chief" kit and hardwood propeller—ready to assemble into a flying model of spectacular performance. Everything is included in this one, low price.

HERE'S WHAT YOU RECEIVE

1. Factory tested and run-in "Baby Cyclone" engine, complete with gas tank, coil, timer and condenser, mounted on wooden block, speed from 500 to 4000 r.p.m. Runs 17 to 20 minutes on 1 ounce of gas.
2. "California Chief" kit with 5 ft. wing, specially designed for record-breaking performance with the "Baby Cyclone" engine—assembled landing gear with 3½" air wheels, cut-to-shape fuselage, tail surfaces and ribs, silk for covering, dope, glue, etc., and full size plan and instructions.
3. Special 13" hi-polish hardwood propeller. Engineered to develop maximum horsepower.

Do not delay sending your order. This offer is good for a limited time only. Use handy coupon and mail it today.

AIRCRAFT INDUSTRIES,
Major C. C. Moseley, Pres.
Grand Central Airport,
Glendale, California

As advertised, send me your complete outfit of engine at $15.75 together with kit and prop. at special price of $5.75 for which I enclose P. O. money order for $21.50.

Name_____
Street_____
City_____
State_____

☐ Engine only $15.75
☐ Kit only $7.90
☐ Propeller only $1.50

"BABY CYCLONE" ENGINES

The Biggest Name In Little Engines

A RELIABLE PRODUCT MADE BY A RELIABLE FIRM

SUPPLIES OF THE BETTER KIND

Sold With a Money-Back Guarantee

FREE WITH EVERY ORDER

A complete solid model kit, containing spun aluminum cowling, alum. prop, insignia, etc., for Boeing XP-26 or Beechcraft. Take your choice.

PLUS FREE POSTAGE ON ALL ORDERS

BALSA WOOD 18" STRIPS

1/16 sq.	.20 for .05
1/16x⅛	.16 for .05
3/32x3/32	.10 for .05
⅛ sq.	.10 for .05
⅛x½	.5 for .05
⅛ sq.	.8 for .05
¼ sq.	.2 for .05
1 sq.	1 for .06

18" SHEETS

1/32x2	.6 for .10
1/16x2	.6 for .13
3/32x2	.5 for .10
1/16x3	.4 for .12
⅛x2	.3 for .15

18" PLANKS

1x3	1 for .15
1x6	2 for .25
2x3	1 for .25
2x6	1 for .45

Double cost for 36" lengths.

BALSA PROPELLER BLOCKS

⅛x⅛x5	.7 for .05
⅛x⅛x5	.5 for .05
⅛x⅛x6	.4 for .05
⅛x1x7	.2 for .06
⅛x1x8	.2 for .06
⅛x1⅛x10	.2 for .08
⅛x1⅛x12	.1 for .08
1x1⅛x12	.1 for .08
1x1⅛x15	.1 for .09

SPECIAL BALSA COWLING AND NOSE BLOCKS

1"x2"x3"	.03
2"x2"x3"	.04
1"x3"x3"	.05

COLORLESS CEMENT

⅛ oz. Tube	.05
1 oz. Bottle	.10
3 oz. Can	.18

CLEAR DOPE OR THINNER

⅛ oz.	.05
1 oz. Bottle	.10
3 oz. Can	.18

COLORED DOPE (ALL COLORS)

⅛ oz. Bottle	.08
1 oz. Bottle	.20
3 oz. Can	.20

JAP TISSUE (20"x24")

White, 2 sheets	.05
Silver, per sheet	.05
Colored, per sheet	.05

RUBBER

.045 sq.	.20 ft. .05
1/16 sq.	.20 ft. .05
⅛ flat	.17 ft. .05
3/16 flat	.12 ft. .07

PAULOWNIA WOOD PROPELLERS, HAND CARVED

5"	.10
6"	.12
8"	.16
10"	.20
12"	.25

BALSA CARVED PROPELLERS

5"	.05
6"	.05
7"	.05
8"	.05
10"	.11
12"	.12

HARDWOOD OR BALSA WHEELS

½"	pr. .03
¾"	pr. .03
1"	pr. .03
1¼"	pr. .05
1½"	pr. .12
2"	pr. .15

CELLULOID WHEELS

¾"	pr. .06
1"	pr. .07
1¼"	pr. .11
1½"	pr. .17

BUSHINGS

Small	doz. .03
Medium	doz. .04
Large	doz. .05

BAMBOO

1/16"sq.x12"	doz. .03
1/16x¼x18"	doz. .07

REED

1/32 O.D.	5 ft. .02
1/16 O.D.	5 ft. .02
¼ O.D.	5 ft. .03

WOOD VENEER

20"x8"	1 for .20
20"x15"	1 for .12

ALUMINUM TUBING

1/16" O.D.	per ft. .07
3/32" O.D.	per ft. .07
⅛" O.D.	per ft. .09
3/16" O.D.	per ft. .11

12" WIDE SHEET ALUMINUM

.003	per ft. .12
.005	per ft. .12
.010	per ft. .19

N.A.C.A. ALUMINUM COWLING

⅞"	.19
1"	.21
2¼"	.27
3"	.30

MACHINE GUNS

*½"	2 for .05
*1⅛"	1 for .08
1⅝"	1 for .07

*Bombs at the same price.

ALUMINUM DRAG RINGS

1½" Dia.	1 for .19
2" Dia.	1 for .21
3" Dia.	1 for .29

DUMMY RADIAL ENGINES

1½" Dia.	1 for .15
2" Dia.	1 for .25
3" Dia.	1 for .30

Celluloid Dummy Motor & Drag Ring Combinations

1½" dia.	1 for .25
3" Dia.	1 for .40

Sheet Celluloid 2"x6" .02

Model Pins, large pkg. .05

Sandpaper, large pkg. .05

Thrust Bearings S. or L. .02

Washers, S. or L. 1 doz. .03

Dope Brushes .02

Nose Plugs .02

Wire (all sizes) 5 ft. .02

Tru-Cut Balsa Knife .10

NO ORDERS LESS THAN 50c ACCEPTED FOR SUPPLIES

36" FLYING CURTISS ARMYHAWK

36" "SKYABILITY" FLYING SCALE MODELS

FEATURING IN EVERY KIT

10" HAND CARVED PAULOWNIA WOOD PROP.

PLUS

- Expert design
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The waves seemed to rise and fall with restless persistence, their flanks often glazed with a pale sheen of reflected moonlight. Against the sky, the waves presented a constantly shifting and fantastic horizon.

The huge hulk to which he clung extended vaguely into the distance. Its tail jutted massively upward, forming a black silhouette. The *Dortmund's* "back" had been broken.

People were about. Unseen. Yet he could hear this anguished cries, mingling with the splash of water. Like the numberless wails of a stormy night.

He lowered his aching head to the taut fabric, half-drowned, ill from the sudden exposure.

A crawling figure sighted him and crept closer. Wet fingers clutched his arm.

"Hey there," the figure demanded, "alive?"

Mathews looked up. He recognized a fellow passenger. Name of Atkins. "Yeah," he drawled, wearily. Then, "I feel sick."

Atkins stared at him a moment, then gripped his shoulder and shook it. "Come. We have work to do!"

Mathews raised his head. "Work?" he murmured. He listened silently to the faint cries that rose to his ears. The cries no longer were mere irritable wails of a storm. They were frantic summons from fellow passengers in desperate need.

"Some of the crew have cut through the fabric and gathered ropes," Atkins explained. "They threaded some of the girders and formed twin stays forward. I'm out trying to pull as many passengers as I can from the water but it's a mighty big job for one man. So, my fellow, lend me your brawn and we'll do a mite o' good."

Mathews struggled erect. "Lead on," he said.

The Canadian was carrying a coil of rope. He knelt and dug a knife from his pocket, then proceeded to cut a hole in the fabric and to anchor the rope to a girder. "We shall throw the other end into the water and pull the poor devils up. Once aboard, we'll send them forward for the crew to watch."

Mathews was peering far below at the water. He turned and their eyes met.

"And how long do you think the *Dortmund* will remain afloat?" he inquired quietly.

Atkins paused. Then he returned to his task. "Not long enough," Mathews heard him murmur.

* * * *

The door to the adjutant's room on the third floor was jerked open in rapid succession as the summoned staff officers of the *reichswehr* hurried in. Buckenbach arrived first and immediately after him, Goebel and Weir. Köppen and Eschfield were late.

The phone rang. Schlesmann caught it up.

"*Ja.* Ah. Wasser. Yes. . . . yes. . . . North beyond Cape Roque . . . *fümf und swanzig.*"

He hung up and stepped to the chart suspended on the wall. Rapidly, with the aid of a rule, he diagrammed the reported area and the direction of the wind movement off the South American coast.

The staff looked on attentively.

Schlesmann faced them. His voice was measured with emphatic deliberation as he began:

"You undoubtedly know why I have assembled you here. The *Dortmund* has not been heard from for more than three hours. Its last message terminated so abruptly, gave us cause to believe that it has crashed. Aid must be dispatched at once. However, we must first determine its approximate position.

"That is our immediate task. I will give you the *Dortmund* messages and all contingent facts. You must find the approximate position of the crash—"

The phone again interrupted him. *"Ja?"* he questioned sharply.

"Wasser reporting to Hauptmann Schlesmann. Twenty-eight wind velocity Cape Verde Tradewinds, intersecting iatitudes at . . . and longitudes at (as diagrammed) . . . Squalls reported southeast of Ascension Islands. Caribbean low barometric area."

"Schoendanks."

The captain placed the latest readings on the chart. It was evident then that the *Dortmund's* crossing had been accompanied by mild weather along its compass route. Therefore, if the *Dortmund* had crashed, it could not have been due to ill-weather.

He faced the five thoughtful faces.

"The *Dortmund* had six motors with a cruising speed of seventy-five m.p.h. It stood off from Rio de Janerio, July 10, at 8:10 P.M. Munich time, with a compass course of 40. This course is not the usual steamship route, so that, if the *Dortmund* crashed, aid is not at hand.

"Four messages were received from them. The first was a personal radiogram. The second was at 11:00 A.M. July 11, reporting the failure of number 3 motor and that number 4 had been cut off to ease the steerage until the broken motor could be repaired.

"The third message, at 4:00 P.M. of the same day, reported the repair of the broken motor and said that everything was going well.

"The fourth—and last—message was hurried, as though something unexpected had occurred. The message had been abruptly cut off before completed. However, there was enough sent out to cause us to believe that a critical situation had arisen. There was no position given. That message arrived at precisely 10:00 A.M. July 12.

"They are all the facts available. I have designated the approximate positions of wind area and speed on the chart. By knowing the compass course of the *Dortmund*, you can determine which of these wind areas will affect its course and thereby ascertain the drift and actual course of the airship.

"Haste is imperative. And remember! Your accuracy may save or lose many lives, whichever it may be.

* * * *

There you are, cadets! Plot the course of the *Dortmund* as given and determine the longitude and latitude (00.00 . . . degrees and minutes, and North, East, South or West—i.e., 19.52E—) of its emergency landing. Mail your answer with the map to NAVI-GOID CONTEST JUDGE, MODEL AIRPLANE NEWS, 551 FIFTH AVENUE, NEW YORK CITY.

How You Can Build and Fly the SOC-1 Scout

(Continued from page 17)

ribs of the lower wing panels and are cemented to the bulkhead extensions forming an integral part of the fuselage. Before covering, cement the tail wheel axle in position.

To cover use narrow strips of tissue to avoid wrinkles. Spray with water and dope. Leave an opening at the bottom to install the landing gear mount.

Use strips of cellophane of a width determined by the size of each space between cockpit formers to cover the enclosure. The shape of the front of the enclosure is easily determined from the top and side views of the fuselage. The sight is a piece of rounded 1/8" stock.

Cut the fillet block to shape from a piece of soft balsa 1/8"x5/8"x7/8" and cement it in position against the front of the extension of No. 4 bulkhead.

Landing Gear

The pants are built up of two pieces, one of which is cut out to receive the wheel. Inspection of the detail will make their construction clear. The 1½" wheels are mounted on .028 wire axles. A joint stiffener also of .028 wire is installed as shown in the same detail. The landing gear leg is cut to size and streamlined from wood 5/16" in thickness. A two-pronged washer of tin is imbedded in the upper joint surface to prevent spreading of the wood while in use.

The landing gear cross brace or mount supports the upper joint stiffeners permanently as seen on the detail. The wood used is ¼" sheet. Where the wire stiffeners of .034 wire pass through the wood, two pronged washers are imbedded in the surface. After the stiffeners have been fastened in position at the required angle to receive the struts, the mount is passed through the opening in the bottom of the fuselage and cemented against the rear face of No. 4 bulkhead. Force the landing gear legs on the protruding joint stiffeners and force the spring of .020 wire in place as seen in the detail and on the front view. Align the landing gear and bind the leg joint securely. Also fasten the spring in place securely at the bottom of the fuselage.

Cover the opening after the landing gear work has been completed.

Tail Surfaces

To obtain the full stabilizer plan, trace the half given and invert. The stabilizer is made in one piece.

The spars of both stabilizer and rudder are of 1/16"x5/16" stock. The cross pieces with the exception of the attachment piece of the fin are 1/32"x5/16". If necessary, cut these odd size pieces from 1/32" sheet balsa. The edges of both stabilizer and rudder are bent to shape from 1/16" in. sq. bamboo around a candle flame. Sheet balsa may be substituted if desired.

To cover use separate pieces of tissue for each side of each surface. Dope the edges in place drawing the paper as taut as possible without wrinkles. Spray the paper evenly and fasten the surfaces securely to the bench while drying. Once dry, dope lightly.

The stabilizer is slid into the opening cut as seen on the plan for this purpose. Cement the rudder in position. The stabilizer is supported by short braces streamlined from 1/16"x1/8" balsa.

Wings

All the ribs on both upper and lower wings with the exception of the mounting ribs of the lower wing are of 1/32" sheet. The excepted ones are of 1/16" sheet as are the fillet ribs already incorporated in the fuselage structure. The spars of the upper wing are 1/16"x5/16" while the spars of the lower one are 1/16"x1/8". The trailing edges are in both cases 1/16"x5/16". The leading edges are shaved down to 3/32"x5/16" before shaping it to fit the rib contour. The top spar of the upper wing is 1/16" sq. The tips of all wing panels are of 1/16" sq. bamboo bent to shape around a candle flame. Sheet balsa may be substituted however. The top wing is cracked at the outer center section rib for dihedral. While the center is fastened to the bench, support the tips at an elevation of ¾" by blocks. Note that the innermost rib of both lower wing panels is slightly slanted to allow for the dihedral. Between the first two ribs of both lower wing panels are inserted rib braces of 1/32"x¼".

To cover use one piece of tissue for the lower surface of the top wing and one

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Complete materials less motor.....$9.50

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Special left hand 14" laminated props for ⅛ h.p. motors .....$1.50 P.P.

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each for the same surface of the lower wing panels. The top of the upper wing is covered with three pieces; one for the center section, the others for the outer portions of the wing. The top surfaces of the lower wing panels are each covered with one piece.

In covering fasten only the edges of the paper at first. Spray the paper thus attached and fasten the surface to the bench until dry. When dry, dope lightly. Streamline the center section struts from $\frac{1}{16}$"x$\frac{3}{16}$" balsa. Fasten them in position as required at the proper slant and angle. When the cement has set, mount the top wing checking carefully for the proper alignment. It would be well to remove small squares of paper wherever the struts come in contact with the frame so that the joints will be secure.

Cement the lower wing panels in place checking the incidence of each relative to the other. Cut the interplane struts to the size seen on the side view from $\frac{1}{16}$"x$\frac{3}{16}$" strip balsa and streamline before cementing in position. As before, remove the paper at the strut joints.

Cut the landing light from soft balsa and cement on the lower left wing at the strut rib.

Cowling, Propeller and Motor

The cowling is built up of five discs of ¼" sheet balsa. The first four are laminated roughly and cut out when dry with a jig-saw. The rear ply has the square hole cut in it for the plug before laminating it to the first four. When the complete assembly has had time to set, trim the profile with a razor and sand smooth.

Cement the finished cowling in place on the fuselage.

The crankcase is a block 1" sq. and $1\frac{3}{16}$" deep shaped as shown to support the nine cylinders. Dummy celluloid cylinders are recommended although an alternate construction of alternate paper discs is depicted. The square plug piece is a scrap of ¼" sheet. The thrust bearing is a tin pronged washer imbedded in the face of the plug.

The propeller is cut in the conventional manner from a block 8½"x2¼"x$\frac{1}{4}$". The tips are rounded after the carving has been finished as shown by the broken lines. Devote care to the precise balance of the finished prop. The shaft is of .028 wire bent at first only at the front end and imbedded in the face of the prop hub. Use a tin washer similar to the one in the plug for the rear face bearing of the prop. Slide a friction washer, and the plug on the shaft and bend the rubber hook.

The motive power is eight strands of ⅛" flat rubber.

The model is painted silver throughout save for the top of the upper wing. This surface is painted yellow. Star insignias 2½" in diameter fit neatly. Mark the outlines of the controls with black paper strips. The wires are No. 60 black thread located as seen on the side view. The photographs also reveal the pertinent details.

Flying the Model

If possible test your SOC-1 over deep grass. Otherwise fly the ship R.O.G. on a few turns, gradually increasing the winds as the proper balance is attained. A small lead weight may be used for balancing. The original model balanced perfectly the first time out. This job is naturally stable and makes a picture in flight. You are bound to find that the distance covered is far greater than might be expected for this type of ship.

Bill of Materials

8—$\frac{1}{16}$" sq. x 36" strip balsa
5—$\frac{1}{16}$"x$\frac{3}{16}$"x36" strip balsa
2—$\frac{1}{16}$"x⅛"x36" strip balsa
2—3/32"x$\frac{3}{16}$"x24" strip balsa
2—1/32"x$\frac{3}{16}$"x24" (sheet) strip balsa

1—$\frac{1}{16}$"x3"x24" sheet balsa
1—1/32"x2"x24" sheet balsa
1—¼"x3"x18" sheet balsa

1—8½"x2¼"x$1\frac{3}{16}$" block balsa
2—$1\frac{3}{8}$"x$\frac{5}{8}$"x⅞" block balsa
1—1" sq.x$1\frac{3}{16}$" block balsa
2—$\frac{5}{16}$"x2"x1⅝" block balsa
2—$2\frac{5}{8}$"x½"x1⅛" block balsa
2—$\frac{5}{16}$"x1"x2½" block balsa

Miscellaneous

1—1 oz. cement
1—2 oz. clear dope
2—sheets white tissue
8 ft. ⅛" flat rubber
1 pr. 1½" wheels
1—½" tail wheel
wire—.028, .020, & .034
silver powder or silver dope
cellophane
3—$\frac{1}{16}$" unsplit bamboo
4—2½" star insignias

Frontiers of Aviation

(Continued from page 13)

The Consolidated Aircraft Corporation may also come out with something big for Pan-American Airways. They are going to double the size of their brand new factory in order to make room for production of these huge ships. A few months ago we brought you the news of the completion of a new Consolidated flying boat for the U. S. Navy. It is a large twin-engined ship and is a great advancement over the previous Consolidated flying boats, 60 of which are now under construction. This new patrol boat has satisfied the navy so much that they have just placed an order for fifty of them with the manufacturer. Total cost is $4,898,000 The patrol boats will have very long ranges.

When Lockheed's new factory is completed at the Burbank airport, construction will begin on a new transport much larger than any built heretofore by Lockheed. It is said that it will carry 14 passengers and will be very similar to the Electra. It will be of all-metal construction and will have a performance surpassing that of the Electra.

For some time a new Navy Grumman scout has been undergoing tests. It is much like the popular Grumman scout except that it is minus that low hanging "belly" and its fuselage is slightly longer.

Grumman's next door neighbors, the Seversky Aircraft Company, will be busy for some time on an order from the Air Corps for 77 pursuit ships. The planes are small single-seaters and are of the general Seversky low-wing design. The pilot sits

well forward in a cockpit covered by a sliding enclosure. The headrest fairs neatly into the rear of the fuselage. The landing gear retracts backwards and upwards into wells streamlined underneath the wing. The method of retracting is very similar to that on the new Navy Northrop bomber of which 54 are now being built. Construction is all-metal and is extremely rigid for pursuit work. A Pratt & Whitney Twin Row engine will probably be used in the ships when they are turned over to the army. Though the true speeds have not been disclosed, the Seversky will be the fastest planes in the U. S. Army Air Corps. Specifications call for a speed of over 250 m.p.h. Air Corps work, completions of a large order from the Colombian government, and the development of an amphibian for China's air force, has kept Seversky so busy that he has not been able to go ahead with his plans for building some commercial amphibians. However the company may soon go to work on proposed six and ten-place transports. They may either be equipped with retractable landing gear or the popular Seversky amphibian gear. The six-place ship, known as the "Sky Yacht," will be powered by a Wasp engine and will have a span of 45 feet. Overall length will be 32 feet 4 in.

Seversky has built a two-place pursuit for the army with a high speed of 280 m.p.h. at 11,000 feet. Range is 950 miles and service ceiling is 25,000 feet. With a gross load of 5,300 pounds, the landing speed is 66.5 m.p.h. Wing span is 36 feet. A retractable landing gear is also incorporated into the design.

Specifications of the Seversky BT-8 Army basic trainer of which 30 have been ordered are:

Length overall—24 ft. 5 in.
Wing span—36 ft.
Height—11 ft. 7 in.
Weight empty—2,992 lb.
Useful load—1,107 lb.
Gross weight—4,099 lb.
Power loading—10.25 lb. per hp.
Wing loading—18.6 lb. per sq. ft.

A modification of the Navy Vought SBU-1 scout bomber has recently been built for use of the high commanding officers of the navy. The rear of the fuselage has been raised to the height of the enclosure to form better streamlining in back of the enclosure. Pants have been built on the ship and other minor improvements have been made. Some time ago a large Navy Vought biplane was said to be built in which the crew entered through the "belly" of the ship. As yet nothing much has been heard of it.

Service Aircraft, Inc., may build a factory at Long Beach, California, soon. They intend to construct army and navy aircraft. Walter C. Chaffee, Jr., formerly of the Northrop Corporation, is president.

Supercharged Menasco C4S and B6S engines are now in commercial production by the Menasco Manufacturing Co. It is interesting to note that George Reis' "El Lagarto" speed boat, many times a Gold Cup winner, is now powered by a twelve-cylinder Menasco engine.

The Glenn L. Martin Co. is developing a new bomber.

The new Northrop navy bomber now on order will be one of the finest planes in our navy. Of modern all-metal construction, it has all the features of Northrop's army attacks plus many additional ones. With landing gear retracted and its long nose housing one of those powerful 14-cylinder twin-row engines well in front of the low wing, it has the lines of a very fast airplane and is our answer to England's Fairey "Battle." Such was its performance that the navy ordered 54 of them.

At the same time 54 SB2U-1s (Voughts) were ordered. Details of these low-wing planes are now well known.

83 Curtiss Navy bombers are also on order. It was not disclosed as to what the Curtiss ships were like, but it is likely that they are of the twin-engined low-wing design.

Build a Model of the North American Aviation Advanced Trainer

The advanced trainer is similar to those now being built in large quantities for the Army Air Corps by North American Aviation, Inc., of Inglewood, Calif. The plane is powered by a Wright Whirlwind of 440 hp. at 2,200 r.p.m.

High speed—184 m.p.h.
Cruising speed—169 m.p.h.
Landing speed—56 m.p.h.
Service ceiling—24,000 ft.
Climb per min.—1350 ft.
Cruising range—920 miles.

The entire wing is of skin-stressed all-metal construction with the fuselage of chrome molybdenum steel tubing, fabric-

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Giant, full-size detailed drawings, 22x34, a large shaped and finished propeller, smooth, finely, and accurately cut balsa strips, all curved parts printed on a glass-like surface of balsa sheet with a hair line of ink, odd assortment of balsa blocks, hardwood tired balloon wheels, the finest quality of tissue made—in 3 colors, washers, music wire, super-flight endurance rubber, generous quantities of glue and banana liquids, directions, washers, a large clear sheet of colored insignia, etc., etc.

5-ft. CURTISS ROBIN $2.50 postpaid

30" DOUGLAS 038 50c postpaid

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A complete, giant, full-sized plan, drawn by experienced model plane engineers, a large supply of clear, accurate and finely cut balsa wood strips and sheets, BALSA RIBS NEATLY CUT AND SHAPED READY FOR USE, large assortment of balsa blocks, a very generous amount of the most expensive model airplane tissue in three colors, music wire, reed, directions, A 12" FINISHED AND SHAPED PROPELLER, real 3" hardwood tired wheels, nose bearing, SHAPED BALSA COWL where needed, super-flight endurance rubber, washers, etc. . .

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- Weight less motor 1½ lbs.
- Wing adjustable to regulate rate of climb and glide
- Landing Speed 17 mi. per hour.

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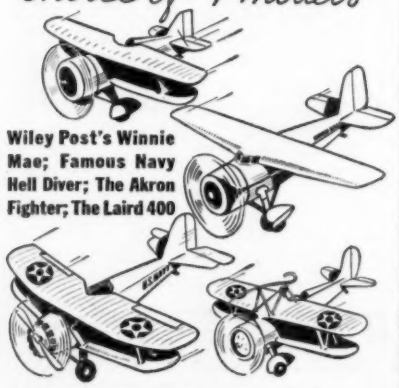

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covered. Fin and stabilizer are metal-covered and rudder and elevators fabric-covered.

Several different versions of this plane have been designed. One such ship may be purchased by the private flier for his own use. Another in the form of fighter and trainer has been designef for export, and others have been designed for use in our Army Air Corps as trainers, one having open cockpits.

Balsa wood should be used for building a model of the trainer. Get dimensions for purchasing material from accompanying plans. It is best to purchase wheels also rather than make them. Purchase a tube of model cement and small cans of blue and yellow dope. Fine and coarse sandpaper, a razor blade, small chisel and saw are the only tools needed.

If you wish to square off the plans, making it easier for measuring, join the corresponding dots on border with straight pencil lines. Each square will equal one square foot.

Make the fuselage first. Draw the outline of the side view on stock and cut to shape with a saw, a jig-saw preferably. Then draw top view and cut again. Then referring to cross-sections, round off the corners of the fuselage with your razor blade and chisel. Take plenty of time and be accurate. Go over the entire fuselage with coarse sandpaper and then smooth it down with the fine sandpaper for doping which comes later.

The wing should be made in three parts, the center section and the two outer panels. Draw the outline of these on flat balsa wood with the grain running lengthwise. Then taper down the outer panels as shown by the front view of the model. Referring to cross-sections, shape out the airfoil sections with your chisel. Be careful not to make the trailing edge too thin and sharp as it will easily break off. Sandpaper thoroughly with first coarse and then fine sandpaper and see that each section fits the other. The wing fillets, the streamlined fairing that joins wing with fuselage, will be made later.

The tail group is very easy to make. The pieces may be cut from sheet balsa with your razor blade and then sandpapered to smoothness. On the real ship, the stabilizer and fin are covered by corrugated aluminum. By drawing straight lines and pressing heavily so as to make small grooves, the same effect may be obtained.

Shape out the members of the landing gear next and use a small piece of wire as the axle. Make the loop antenna from a flattened piece of copper wire. Cut the radio mast from a scrap piece of wood. Shape out the prop and then go over all parts with fine sandpaper once more. Brush off all dust and then begin the assembly.

Lay the fuselage in flying position on a level surface and then join the center section of the wing underneath, applying plenty of cement. Then join stabilizer and elevators in place and then the rudder and fin. Use small blocks to hold them in place.

Join the outer wing panels with blocks under the wing tips to give them the correct dihedral until the joints dry. Raise the model and cement the landing gear in place, including tail wheel. Join the loop antenna to the fuselage between the landing gear and put on the struts and wire that join it under the fuselage. It is best to use black thread as wire.

Join the prop to nose with a straight pin as shaft. Cement the radio mast to top of the fuselage and connect thread from the top of the mast to the top of the vertical fin.

The wing fillet should be made of plastic wood or putty. Make this next.

Once more go over the entire model with sandpaper. Brush off all dust and then dope the model the standard army colors of blue and yellow. The wing and tail unit should be yellow and the rest of the model blue except for trimmings. Paint the windows white with black panels. The vertical band on the rudder should be blue and the horizontal dark stripes red, the others white. The insignia on the wing should have a background of blue with a red circle in the center of the white star. Paint tires black.

Many coats will have to be applied before a smooth finish is obtained. Do not apply a second coat until the first has dried thoroughly.

Designing Your Fuselage Model

(Continued from page 23)

degree positive. The stabilizer is given this slight positive angle because the wing is to be placed well above the line of thrust. The higher the wing, the greater the stabilizer angle should be.

Substituting the correct values in the formula for the symbols, the formula appears as follows:

$$a_s = (8/8)(70/33)(6+5)\left[1-\left(\frac{2+\frac{2(1.125)}{11}}{5}-2\right)\right]\left(1-\frac{(1.62+1)}{12}\right).$$

Solving the formula, we find that the stabilizer area should equal:

$$a_s = 17.5 \text{ square inches.}$$

This is the smallest amount of area that should be used in the stabilizer.

The model equipped with such a stabilizer would be reasonably stable, but not exceptionally so. Insomuch as this is a model designed for exceptional stability, it is wise to use about 20% more stabilizer area than specified by the formula. 20% of 17.5 square inches would be 3.5 square inches. The area of the stabilizer for your stability model, therefore, should have an area of (17.5+3.5) or *21 square inches*. Here again, the area specified by the formula, allowances being made for exceptional stability, is about the same as given by the approximate rule. The value for this area as specified by the formula is low because of the unusually stable arrangement of the C. of G., the C. of L. and the line of thrust. Thus for normal cases, very little stabilizer area is required, but in order to reap the advantage of this beneficial arrangement, the area should be about the same value as on normal models, that is 30% to 33% of the wing area.

There is one more important point about the tail surfaces that should be mentioned. The weight of these surfaces should be as small as possible. Their structure should be so designed that they will be as light as possible, which fact lightens the whole tail of

the airplane and allows the center of gravity to be located well forward, thus increasing the general stability of the airplane.

Landing Gear

The function of a landing gear on a model plane is not what it appears to be to the average person. Primarily it is on the plane for the purpose of taking off from and landing on the ground. However it may be made to serve very important functions in respect to stability.

First, its weight being low on the plane, it helps to lower the center of gravity. Second, its lateral area being low, it tends to insure a low center of lateral area.

By designing a landing gear of proper weight and locating it with care on the plane, the center of gravity may be made to coincide exactly with the point selected for it on the force arrangement diagram (Figure No. 116). Usually wire or other material of sufficient strength is used for the landing gear struts. Then wheels are selected with such a weight that the center of gravity of the whole plane lies on the horizontal line passing through the point selected for the position of the C. of G. Next the wheels are moved forward or backward until the actual C. of G. coincides with the point selected for its position. (See Nov., 1933, issue for calculation of C. of G.) If required, more weight may be added to the wheels to bring the C. of G. forward. This may lower the C. of G. more than required, but such a condition will only aid stability. Never lighten the landing gear so the result is a position of the C. of G. which is above the selected point (Marked C. of G. on Diagram).

The size of the wheels is important too. As a rule, they should not be large purely for the sake of looks, but as large as possible in order that their area will help to lower the *Directional Center*. This is important. If this point is not as low as desired often fillets are fastened between the front and rear landing gear struts. This provides low lateral area which makes it unnecessary to belly down the bottom of the fuselage excessively in order to insure a low *Center of Lateral Area*. The objective in choosing the size for the wheels should be to produce as much *low lateral area* as may be commensurable with good looks.

Fuselage Bottom's Position

Now we come to the factor of design that definitely fixes the position of the center of lateral area—the shape and position of the bottom of the fuselage. The more the bottom bellies downward, the farther down the sides of the fuselage will extend. Consequently, the more lateral area there will be produced *below* the center of gravity. This helps to balance the lateral projected area of the wing and other parts of the model that lay above the C. of G. By bellying down the fuselage bottom sufficiently, the directional center may be lowered to the point chosen for its location, which is indicated in diagram No. 117 by letters (C.L.A.).

The way of determining the exact location of the bottom side of the fuselage is to proceed as follows: Draw an exact side view silhouette of your plane on a piece of cardboard, drawing the bottom line of the fuselage so that it bellies downward extremely, as indicated by line (P) in figure No. 118. When you do this, draw the propeller outline full size. Then divide it in half vertically, and erase the front half. Now cut out the silhouette, cutting away the cardboard between the landing gear struts and the front half of the propeller that has been erased. Next tie a thread to the head of a pin and stick the pin into the cardboard in a vertical position at the point at which you wish the center of lateral area to be located. If the cardboard silhouette does not balance at this point, when it is suspended by means of the thread, try other points until the point is found at which the pattern will balance horizontally. If this point is below the desired C.L.A. point, cut the bottom of the fuselage away, slightly curving it to the desired shape. Now find the new point of balance by means of the pin and thread. Follow this procedure until you have shaped the fuselage bottom so that the pattern balances when the pin pierces it at the point marked C.L.A. or at a point slightly above it, or to the rear of it on a horizontal line drawn through point C.L.A. If the pin is to the rear of this point, it means that the fin area may be too large and you may reduce it slightly unless the wing span is very large. When the fin area is reduced, the pin can be moved farther forward. If the silhouette balances when the pin is located *ahead* of C.L.A., more fin area must be added. In either case, the position of the bottom of the body probably will

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have to be relocated. When the pattern balances at point C.L.A. the side view plane of your model plane, as represented by the silhouette pattern, is correct. The side view of the plane should look like the silhouette portion of figure No. 118.

Now that all the aerodynamic characteristics of your model have been determined, all that remains to do is to establish the shape and outline of the various parts, such as the wing tips, the propeller blades, the fin, the stabilizer and other minor parts. The factors which determine their shape are the same as in the case of the stick model, discussed in the August installment of this series. It is advised that these parts are given the same general shape as the corresponding stick model parts.

Plans for the stability fuselage model, the design of which has been outlined, will be presented in our next issue, with structural details so that readers who choose to do so, may build and fly this ship. The next installments of this series will discuss the stability characteristics of other types of models, such as the *mid wing* and *low wing*.

Will the Bomber Replace the Pursuit Plane

(Continued from page 5)

planes must base on aircraft carriers. The limitations of carrier take-off preclude the use of especially heavy bombers, and hence of especially long range bombers. Therefore, to make the airplane attacks, the hostile carriers must come fairly close to shore and at time of take-off and landing of their planes will be well within the reach of light bombers, which need carry only very light bombs to destroy hostile planes on the carrier decks or to put the deck itself out of commission."

Thus shore-based bombers along our coast would be adequate defense without sending our airplanes to sea. And notice that it is the bomber and not the pursuit type that is looked to put the enemy out of the air.

"Airplanes operating from land bases against carrier-based airplanes have the following advantages over the latter: (a) They can take off and land in formation as against single-ship take-offs and landings, affording a tremendous saving in the time factor; (b) Their flying fields are far less vulnerable to damage than flying decks, and they can have alternate flying fields to use in case primary fields are damaged; (c) If defeated, they can withdraw and disperse to numerous landing fields, while if carrier-based planes are defeated in the air, they face annihilation on the carrier or capture if they land in hostile territory; (d) Their opportunities for information are greater, due to more numerous observation points.

"Their disadvantages lie in the ability of the carrier-based planes to select their time of attack, which is known to them and unknown to the shore-based airplanes; and the position of the carrier is movable while that of the targets of its airplanes is fixed.

"The air force crucible must melt all conflicting tactical doctrines and methods into one integrated whole."

The contest at Wright Field is centering around 3 ships built by Boeing, Martin, and Douglas. The air corps requirements call for a top speed of from 200 to 250 miles per hour at 10,000 feet altitude, for an endurance at operating speed of from six to ten hours, and for a service ceiling of from 20,000 to 25,000 feet. It has been stated unofficially that at least two of the bombers have reached a speed of 250 miles per hour while carrying a military load! Think of it—a heavy bombardment airplane travelling at a speed 30 miles an hour faster than the racing plane which won the Thompson Trophy Race this year, America's foremost speed classic!

The Boeing plane, a four-engined job, is claimed to be the first airplane in the world which will be able to complete a military mission in case one engine ceases to function. It is also said to have a greater cruising range than any airplane heretofore produced. Both the Martin and the Boeing ships are equipped with an automatic pilot, two-way radio, and a radio "homing" device.

While many critics point an accusing finger at the small number of airplanes in our air corps, this is in reality a wise policy, for aviation is always confronted with the possibility, and indeed the probability, that the modern airplane of today may be obsolete in a few weeks. Therefore, this country maintains only a skeletonized air force, but is ready to go into large scale production on a moment's notice.

We have seen how pursuit aviation has definitely lost a lot of its prestige. Whether or not it will disappear alto-

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gether, giving away to "aerial battle cruisers," as so many believe, will probably become evident in the not far distant future. That is what the air corps wants to find out.

Ways and Means of Gas Model Success

(Continued from page 15)

in so doing. Any rubber strands holding parts of the ship together, or used as shock-absorbers in the landing gear, should be replaced with fresh ones every time you attend a meet. Be careful not to splash any oil on these rubber strands, as oil tends to swell and weaken rubber.

Another thing most fellows do that they shouldn't is wait until the day of the contest before they test the power plant of the ship. This should be done not later than the day before the meet, so you'll be sure the motor will run when it has to. Check all ignition wires and be sure that there aren't any wires that are hanging by just a single strand. That strand may decide to part during an official flight—possibly on your last official flight!

It would be a good idea to have some spare ignition parts along, such as spark plugs, a spark coil and condenser, and some wire. Don't forget to bring plenty of fresh battery cells along with you. Remember to bring your own fuel with you. Don't depend on the other fellow. Your engine might not run on his fuel. Do you remember that old saying, "What's fuel for one engine is just a lot of hooey to another?"

Well, that pretty nearly covers the preparation for a meet. Now for the problem of putting the ship into storage between contests, or for the winter. If there are any damaged parts, repair them. Put the whole ship into A-1 condition. Disassemble the ship, wrap the wing sections and the tail units with paper, so that they will not be scratched by sharp edges. Do the same to the fuselage. If there are any rusty parts either on the landing gear or anywhere else, take the rust out with some light sandpaper and oil. Give all metal parts a protective coat of oil or light grease. Wash the gas tank of the engine unit thoroughly with pure gas. If you don't do this, the oil will gum up on the bottom of the tank, clogging the gas line. Pack the different parts of the ship into the crate in which you transport your model from place to place, with plenty of paper betwen parts so that it gives a cushioning effect. Now store the crate in a place where the temperature and humidity is moderate. A damp place will cause the surfaces to warp, while an excessively warm place will make the balsa and other wood parts of the ship rather brittle.

If you haven't a suitable carrying case in which to transport or store your ship, you can make a good one, using 1" x 2" wood strips for a frame, and covering it with plywood (the type used in packing cases for radios).

After wading this far through the article, some of you fellows might get the idea that gas-model building and flying is just a lot of serious and complicated work, full of do's, don't's, remember's and don't forget's. This isn't so! Gas-model building and flying is a thoroughly interesting, educating, and enjoyable pastime and sport. This series of articles is meant primarily to acquaint model airplane fans with the technical aspects of the gas-model.

If some of you haven't as yet seen a gas-model or been to a meet, make it a point to attend a contest, even if only as a spectator. You're bound to get a laugh out of watching some fellow crank an engine time and again, without results—trying to get it running without any gas in the tank, or with the ignition switch off. The amusing part of it is that it is usually some interested bystander, innocent of any technical knowledge, who suggests the possible cause of the trouble to the baffled "expert" (Again, I'm speaking from my own personal experience)! It would take many articles the size of this one to tell about some of the things that happen at some of the meets. So the best thing for you to do is to get "in the swim." The water's fine!

Note! If there is anything more you would care to know about gas-models, write the I.G.M.A.A., care of MODEL AIRPLANE NEWS.

Gas Lines

(Continued from page 7)

not seem inclined to build gas jobs but Hewitt Phillips, second place winner in the Texaco event was the spark that started the fire and the I.G.M.A.A. adds another active chapter. The Jordan Marsh club is one of the largest and certainly the most active group in the country. We are proud to have them in our midst.

From S. W. Lamberg comes picture No. 4 of his model which he has named "Spar Ribs" by which we should take it for granted that the model really has ribs and spars. The model has an eight foot wing span and a 13¼" chord and is powered by a Brown engine. He tells us that the ship is very stable and has a very slow glide. The model has flown regularly with an automatic time switch which proved successful on the numerous trials the ship was put through. The more we hear of time switches, the more practical they seem to us. In time every model will have that safety measure installed. It is easy to believe that time switches will forever more stifle the talk that gas models are unsafe. Mr. Lamberg may be reached at 939 Hopkinson Ave., Brooklyn, N.Y. Let us hear more about it, please.

Picture No. 5 comes from Stanley Beecher of 728 W. 181 St., in New York. It is a good "shot" of Bill Effinger's autogiro powered by a Brown engine and taken at last year's Eastern States meet in which there was a special event for gas model autogiros. At that time, as we remember, there were four models made and the only one to attempt a flight was Effinger. The time was two seconds (enough time to fall from the launcher's hand to the ground) and Bill walked off with the prize. Let's hear from some of you experts about gas autogiro models. There shouldn't be too much trouble in designing one that will fly. Let's made it an I.G.M.A.A. project.

Picture No. 6 comes from Fred Pilcher of 718 Fifth St., Rochester, Minn., who tells

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Sandpaper	pkg. .05
Prop Shafts	doz. .08
Rear Hooks	doz. .08
Washers ½ to ¾	dz. .03
Nose Plugs ½"	dz. .10

Sheet Alum.

.0003x3½	ft. .01
.005, 6x6	.05
.010, 6x6	.06

Thrust Bearings

Small or large	ea. .02

Radial Eng. Cello.

1½" .10;	2" .15
3" .20	

Eng. and Cowl. Cello.

1" .20;	2" .25; 3" .35

Alum Tubing 1/16 or ⅛ ft. .07

Alum Cowlings

Closed or Open 1½" .15;	2" .18
3" .25	

Guns—Ring Mount 1¼" .10; 1¾" .15

Pursuit Guns ¾, 1¼, 1¾ ea. .05

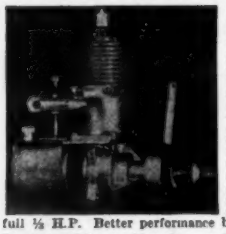
FREE POSTAGE ON ALL ORDERS IN UNITED STATES FOR 75c OR OVER. CANADA, U. S. POSSESSIONS, AND FOREIGN, ADD 15%. UNDER 75c, ADD 10c No C.O.D.'s. No Stamps. Add 10c packing charge when 36" lengths are required.

20 IN. FLYING PLANS 10c—3 for 25c
Sparrow Hawk, Boeing Trans. 247, Spad Chass., Vought Corsair, Curtiss Swift L. W., Waco Cabin Biplane, Douglas Dolphin, Boeing P12F, Fokker D-VII, S.E.5, Goshawk, Gee Bee, Boeing P26A, Monocoupe, Northrop Gamma, Fairchild 24 Cabin.

Dealers, Clubs, Schools: Send for List

IMPERIAL MODEL AERO SUPPLY
416M McDONALD AVE., BROOKLYN, N. Y.

No Bunk In Our Claims



You can expect better performance because the LITTLE HERCULES is built different,—modern as the big motors. Long wear (not the ordinary life of a common model motor but 5 times as long) may be expected, —possible only because of its modern construction, with piston rings, light weight alloy piston, adjustable spark and over-sized high speed bearings. Speed and power are controllable from idling to a full ½ H.P. Better performance because of better design.

Do Automobile or Aircraft manufacturers of today build their motors with CAST IRON pistons, WITHOUT rings, WITHOUT adjustable spark? NO,—nor do we. You would not buy a car without these modern features, so why buy such a motor.

Final performance of your plane depends upon the motor. Make sure it is of modern design, of sufficient power. With a LITTLE HERCULES, you have a greater chance to come out on top.

Our SPARK COIL is the most powerful on the market and will improve the running of any motor. Replace your weak coil and see the difference.

Please enclose stamp for literature.

FORSTER BROTHERS
154 Desplaines Ave., Forest Park, Ill.

FLY-A-WAY GLIDERS AND MOTORPLANES

CONSTRUCTION SETS

FLYING & SHELF SCALE MODELS

All kits complete — No extras to buy

20" Flying Model Construction Sets

NC-151 Wedell-Williams	NC-152 Fairchild 24
NC-153 Bellanca	NC-154 SE 5A
N-155 Monocoupe	N-156 Douglas Observation
N-157 Curtiss Hawk	N-159 Stinson Reliant
N-161 Waco D	N-162 Puss Moth
N-163 Hughes Northrop	N-164 Fokker D8
N-171 Lockheed Vega Winnie Mae	N-172 Ryan Sportster
N-173 Rearwin	N-174 Taylor Cub
N-175 Cessna	N-176 Corbin Super Ace

2 sets for 60c postpaid

SEND 5c FOR CIRCULAR SHOWING OUR COMPLETE LINE OF 12 INCH, 20 INCH, 24 INCH, AND 30 INCH FLYING MODELS, 8 INCH AND 12 INCH SHELF MODELS, ALSO 6 INCH AND 10 INCH BOAT MODELS.

MOTORPLANE
No. 500 ARMY FIGHTER — 13½" PRINTED WING 6" CARVED PROPELLER, RED WHITE & BLUE BOX. EACH 10c (20c Postpaid.)

GLIDERS
No. 25—24" Printed Wing, Slotted Body..10c
2—12" Printed Wing, Slotted Body....5c
14—13½" Printed Wing, Slotted Body.....5c
188—12" Sling Shot & Shooter.....5c
Above all packed in red, white & blue boxes—include 10c for mailing charges.

PAUL K. GUILLOW WAKEFIELD, MASS.

us, "My model has a wing span of five feet and weighs 2¾ pounds, powered by a Brown. I notice that some of the boys wait for warm weather to fly. I found this past winter that my Brown motor performed as well in zero weather as in the summer." Yes, Fred, but then we hear from some fellows about using a blow torch to warm your engine up in the winter. Names and addresses of blow torch users will be furnished on request. It actually happened and not so very long ago either.

A picture of a biplane (Picture No. 7) comes from Lewin T. Spittle at 7 Herschel Road in Cambridge, England, who writes, "This five foot biplane is quite conventional and weighs six pounds. On its first test a very sudden gust lifted it up, added to which the motor gave out with the result that there was a few months' work lying in a heap." Of course the above is something we have all gone through and only the perseverance which most model builders have, keeps them advancing and gaining knowledge that will be found invaluable in later years . Here's wishing you better luck on the next model.

Picture No. 8 is of a beautiful model built by Alexander Buga of 1021 St. John Ave., Bronx, N.Y. The model has gone through many adjustments until its designer found the proper moment arm. He says in part, "With each flight I realize more and more that great care must be exercised if the plane is to continue to fly. The model is powered by a Cyclone and weighs 45 ounces. The estimated speed is 35 m.p.h. and the fuselage is monocoque (hollowed balsa). I really built the model to give me a little gas job experience so that I'll know where I stand as to chances of controlling one by radio. My 'private airport' is on the site where the proposed Bronx airport was started. It is perfect for testing models without washing them out. The field is unapproachable except by boat which we hire for a $1 a day at City Island. For those living in New York City, the boat house can be reached by getting off at the Pelham Bay Park station. There is complete privacy for experiments."

Knowing how spectators can crowd you at an airport when you are trying to test hop a model, we can appreciate Mr. Buga's using the island. It should be quite a relief flying there for those builders who really want to do work instead of worrying about the size of the crowd they attract.

Picture No. 9 comes from Bob Scarborough of Buffalo, S.C. It is a K.G. he built a year ago which is a consistent flyer and takes off without pushing. The model has never cracked up even slightly. It is our aim to see models built that will fly without any danger of crack-ups. Bob tells us that he is now building a Turner model which he will cover with sheet balsa and install bulkheads so that his K.G. motor mount will fit into it.

From Winston B. Mackley, club captain of the Auckland Model Aeroplane Club in New Zealand, comes picture No. 10, of a K.G. 3. Mr. Mackley tells us, "The first gas bus to be flown in Auckland was flown at Mangare airport a few weeks ago. This machine, a K.G. job, was constructed by Mr. F. C. McDonald, president of our club and is certainly a 100 per cent piece of work. In flight this machine behaved perfectly and on just a few drops of petrol clocked 82 seconds. Unfortunately it was slightly damaged on landing, thus postponing further tests. However, wait till we fill the tank up and then you will hear of us some time."

Picture No. 11 shows Mr. Raymond P. Scott ready to launch the gas job which he has recently completed. It is a Heath Parasol model with a Baby Cyclone engine. Mr. Scott has shown great fortitude and energy in overcoming his affliction of being deaf and dumb. He has been building models since he was twelve years old of the rubber-driven variety, that being fifteen years ago. Mr. Scott writes us that he would like to hear from other people with his affliction who have gas models in the United States. He believes that he was the first one to take up this interesting pastime. He has built three gas jobs this year, his first being the Curtiss Robin, second the Heath Parasol and third, the Miss America, which is now under construction. He says all his planes have flown well, all having wing spans of seven feet. The wings themselves are built of two pieces which fasten together at the fuselage mount. Instead of using an automobile to transport his models to the flying field, Mr. Scott has been using a motorcycle and side car. This may be an idea for other model builders.

We have a letter of interest from Mr. Fred Steven, Hon. Secretary of the Launceston "Albatross" Squadron of the Model Flying Club of Australia, 243 St. John Street, Launceston, Tasmania, Australia. He says:

"Just a few lines from far away Tasmania. It is almost two years since you have received a letter from us, but in that time a lot has happened in the model aviation world here.

"One thing above all others is that we have gone "gas buggie" mad, as has everyone else in Australia. We were very fortunate in that the Texas Oil Company gave us a Brown Junior motor for competition among my club members last year. We arranged to fly for it at the same time that we ran off the last heats

for two cups that we had been flying for for a long time.

"We flew for them on the morning of December 15, 1935, and it was a morning of records, for us at any rate. Flying started at 9 o'clock and at about 10:15 the first record "went west." I happened to be the lucky one and broke the previous record of 50 2/5 seconds with a flight of 55 seconds. About half an hour later I again broke the new record, this time with a flight of 65 seconds. This won for me the Hopwood Cup for all time. Then in the President's Cup event I was lucky enough to get a 69 4/5 second flight. As this was the best time in the event it won the cup for me, and also the engine, as we had agreed that the best time made during the day should take the Brown Junior motor. Anyway, the club got the motor back, as we had all signed a paper saying that the winner of the motor should redonate it to the club.

UNIT ACTIVITIES

New York, N.Y.-Newark, N.J.

The Metropolitan Model League of Newark and New York chapters of the I.G.M.A.A. announce a gas model contest for the month of September. The meet will be run in a slightly different manner. The motors will be allowed only 45 seconds of running time. The planes will be judged for duration, take off, flight and landing. This is something new in the east and the results should be interesting. For those wishing to try their timer ideas, we suggest this as a good opportunity. Gilbert Rosenzweig, a member of this chapter has developed an air speed indicator for gas models, information on which will be forthcoming in the next issue. His model "Dorothy I" was lost in the Newark Airport swamps when it flew out of sight. It was powered with a Hurleman engine. Gilbert offers a $10 reward to the finder. Airport visitors might find it worth while to look around.

South River High School, New Jersey

As an example to all our chapters, we print the by-laws of the South River High Chapter. This chapter is one of the most active and best organized groups in the Association. Other chapters who do not wish to follow these laws will certainly get enough ideas to be able to draw up one of their own without very much trouble.

South River High School Model Aero Club Chapter of the I.G.M.A.A. By-Laws

Object of the club:

To encourage and assist in the building and flying of model aeroplanes. To study the principles of aeronautical science.

Membership:

Any student in the South River High School is eligible for membership, provided, he has built a model aeroplane that flies successfully or that he has attempted to build a model aeroplane or that he can convince the faculty advisor of the club that he has a genuine interest in model aeroplanes.

New members may be admitted to the club only by a majority vote of the members.

Members may be expelled by a two-thirds majority vote after they have been given a fair hearing.

Officers:

The officers of the club shall be a president, vice president, secretary and treasurer.

The officers shall be elected at the first meeting of the club in September and shall serve for a period of one year.

A majority vote shall elect each officer.

An officer may be reduced in rank by a two-thirds majority vote.

Officers must attend 3 out of 4 meetings unless prevented from doing so by some unavoidable incident.

Duties of the officers:

President

The president shall preside at all meetings.

The president shall cast a vote only in case of a tie.

The president shall appoint all committees.

The president may call special meetings only with the consent of the faculty advisor.

In case the president resigns or is removed from office, another election may be held.

Vice-president

The vice-president shall preside at the meetings in the absence of the president.

He must also act as librarian and stock clerk.

As stock clerk, the vice-president is responsible for all supplies and equipment purchased by the club and he must be able to satisfactorily account for all said supplies and equipment at any time.

As librarian, he must keep a record of all books, magazines, pamphlets and equipment.

Secretary

The secretary must keep the minutes of all meetings and be responsible for all the correspondence of the club.

He must keep a duplicate copy of all correspondence sent out by the club.

He must keep his records up to date and available at all times.

Treasurer

The treasurer is responsible for the safe keeping of all club money.

The treasurer may make no purchases or pay any bills or claims without the authority of a majority vote of the members.

The treasurer is responsible for the collection of dues and must make a report to the president and faculty advisor each week showing the amount collected and the record of each member regarding dues.

The records of the treasurer must be accurately kept and available for inspection at any time.

Meetings:

Meetings shall be held each Tuesday at 3:15 in the high school.

Business metings shall be held the 1st and 3rd Tuesdays of each month or on any other meeting day if necessary, provided a quorum is present. A quorum constitutes two-thirds of the members.

The place of meeting may be changed by the faculty advisor or a majority vote but notice must be given every member in advance in case of a change in the meeting place.

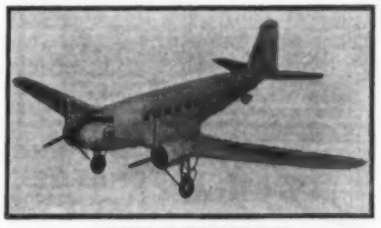
All club resources and time shall be used

NATIONAL'S NEWEST and LARGEST FLYING SCALE MODEL

"Taylor Club" Wingspan 52½" Length 32" Weight 5 ozs.

COLORS: RED AND WHITE

A perfect 1½" miniature of this most popular sport plane, designed for easy, quick construction and marvelous flights. Kit contains full size 3-view plans and detailed instructions, all spars and longerons to full length —28 wing ribs, nose block and propeller, semi-finished. New shock-absorbing landing gear, finished wheels, metal parts, rubber motor, tissue in colors, cement and dope. No extras to buy..... $1.50 Plus 25c Postage



DOUGLAS TRANSPORT

Faithfully detailed 1-2" scale model of the famous transport, the "Pride of the National Line." The kit includes: turned motor cowls; nose block and wheels, 3-bladed props, (flying and scale); printed balsa parts; flexible shaft gearless transmission; headlights; windows; doors that open; cement; colored dopes and many other features—3-view full size plans and instructions.
Wingspan 42¼"; Length 29¼"; Weight 8 oz. $5.00
Plans only $1.00, plus 15c postage. Plus 50c postage

SANDY'S EAGLET

¼" Solid scale model to build Bill Barnes famous Eaglet as piloted by Sandy—each kit complete—(Plus 10c P.P.) 25c

Group also includes: Gee Bee, Laird 400, Nieuport and Texaco.

BOEING P26A SOLID

A ½" solid scale model. Louvres, inspection patches. Motor complete to spark plug leads (you make all). Colors, army, yellow and olive with full insignia. Full size plan with all details.
Wingspan 14" Length 11.75" 50c plus 10c postage
Plans only 15c

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No Order Accepted for Less Than 50c.
ON SUPPLY ORDERS UP TO $1.50 ADD 15c FOR PACKING, POSTAGE & INSURANCE.

BALSA WOOD

18" Strips

1/16x1/16	20 for .05
1/16x1/8	16 for .05
1/16x3/16	14 for .05
1/16x1/4	12 for .05
1/8x1/8	10 for .05
1/8x3/16	8 for .05
1/8x1/4	6 for .05
3/16x3/16	6 for .05
1/4x1/4	3 for .05
1/2x1/2	2 for .05
1/2x1	1 for .05

18" Sheets

1/64x2	2 for .10
1/32x2	2 for .10
1/16x2	4 for .10
1/8x2	2 for .10
3/16x2	2 for .10
1/4x2	2 for .10

18" Planks

1x1	1 for .09
1x2	1 for .15
2x2	1 for .30
2x3	1 for .30
2x6	1 for .45

18" Birch Dowels

1/8, 3/16, 1/4 dia. 5c

15" Bamboo

1/16x1/4 12 for .10
.01 ea.

Machine Cut Propellers

5"	3 for .10
6"	1 for .05
8"	1 for .07
10"	1 for .10

Hand Carved Propellers

5"	.10	10"	.25
6"	.12	12"	.30
7"	.20	14"	.35

Aluminum Props

1¾" long 4 for .05
1" dia. 3 bladed 2 for .05

Celluloid Motors

1½" dia.	each .15
2" dia.	each .20
3" dia.	each .35

Balsa Wheels

¾"	per pr. .04
1"	per pr. .05
1½"	per pr. .07
1¾"	per pr. .08
1¾"	per pr. .12
2½"	per pr. .20
3"	per pr. .25

Celluloid Wheels

¾"	per pr. .07
1"	per pr. .08
1¼"	per pr. .12
½"	per pr. .10

Aluminum Wheels

½"	per pr. .10
1"	per pr. .15
1½"	per pr. .25
1¾"	per pr. .35

Celluloid Pants

For ¾" & 1" wheels per pr. .10
For 1¼ & 1¾" wheels per pr. .15

Tweezers

Each .15

Brushes

Pointed .05
Flat ¾" .10

Cast Metal Props

1½"	2 Blades .07
2½"	2 Blades .10
3½"	2 Blades .20
1½"	3 Blades .08
2½"	3 Blades .15

Aluminum Motor Nose Plates

¾" for 1½" Motor .05
1¼" for 2" Motor .10
1¾" for 2" Motor .15

Cast Guns

1"	each .03
1½"	each .06
2"	each .10

Cast Guns with Ring Mount

1½"	each .20
2"	each .35

Bombs

¾"	each .05
1¾"	each .10

Wing & Tail Lights

Small	3 for .10
Medium	2 for .20
Large	1 for .35

Hair Wire

36 gauge, per spool .10

Metal Fittings Wing Clips

Large or Small 2 for .05

Prop Hangers

Large or Small 2 for .05

Rear Hooks

Large or Small 2 for .05

Steel Beads

Per doz. .03

Washers

¼" dia.	per doz. .03
½" dia.	per doz. .05
¾" dia.	per doz. .06

Jap Tissue

White	2 for .05
Colored	each .05
Black, Orange, Red, Yellow, Green, Brown, (new) Silver	

Rubber Motors

.045	20' for .10
1/16 sq.	25' for .10
1/32x1/16	50' for .10
1/32x3/32	25' for .10
1/32x1/8	25' for .10
1/32x3/16	25' for .10

Music Wire

Coils or straight 1 ft. lengths, .014, .024, .028, .034 10 ft. .05

National Cement

Tube .05
1 oz. bot. .10
1 pint can .75

Clear Dope

1 oz. .10
1 pint .75

Colored Dope

1 oz. White, Black, Orange, Brown, Olive, Blue, Gray, Red, Green, Yellow .10

Corrugated Paper

Yellow, 4x6" .03

Acetone

1 oz. .10

NATIONAL MODEL AIRCRAFT & SUPPLY CO.

23 Avenue "E" Dept. A-75, New Rochelle, N. Y.

DUAL PERSONALITY

QUALITY ● SERVICE

Put us to this test and satisfy yourself

● ENDURANCE MODELERS

FREE 35 Ft. 1/8 Flat Special Brown Endurance Rubber with every order

36" BALSA STRIPS

1/32x1/16....20 for .10
1/16x1/16....20 for .10
1/16x1/8.....16 for .10
1/16x3/16....14 for .10
3/32x3/32....17 for .10
1/8x1/8.....15 for .10
1/8x1/4.....5 for .10
1/8x3/8.....4 for .10
3/16x1/4.....4 for .10
1/4x1/4.....3 for .10

36" BALSA SHEETS

1/64x2.....3 for .20
1/32x2.....4 for .20
1/16x2.....4 for .20
3/32x2.....3 for .20
1/8x2.....3 for .20
3/16x2.....2 for .20
1/4x2.....2 for .24

Double prices for 3" widths

SPECIAL BROWN RUBBER

1/8 Flat.....12 ft. .05
3/16 Flat.....10 ft. .05

MUSIC WIRE

.014, .020, .028, .034
6 ft (3 ft. lengths)...04

JAPANESE TISSUE PAPER

White and all colors.....2 for .05

SILVER TISSUE

Per Sheet.....05

COLORLESS CEMENT

1 oz.....10
2 oz.....15
4 oz.....25

CLEAR DOPE
COLORED DOPE
All Colors
Same prices as cement

BAMBOO

1/16"x1/4x12" each .01
1/16"x1/4x12" doz. .08

Balsa Propeller Blocks

3/4x1x8.....2 for .06
3/4x1 1/4x10.....1 for .04
3/4x1 1/4x12.....1 for .06
1x1 1/2x12.....1 for .08
1x1 1/2x15.....1 for .09

Add 10c for special sizes of the above

WASHERS

1/8" or 1/4" per doz. .02
(Small or large)
Each ..... .02

CELLULOID WHEELS

1" diam. per pr.....08
1 3/8" diam., per pr. .11
1 7/8" diam., per pr. .16

ALUMINUM TUBING

1/16" O.D., per ft.....09
3/32" O.D., per ft.....10
1/8" O.D., per ft.....11

ALL ORDERS POSTPAID

Remit by cash or postal money order. Add 10c for all foreign orders. No stamps or C.O.D accepted. No orders under 50c accepted.

DEALERS SEND FOR SUPER DISCOUNTS

Dual Model Aero Supply Co.
2515-M4 ATLANTIC AVE. BROOKLYN, N.Y.

OUT OF THE LABORATORY INTO THE AIR!

THE FLYING ROCKET SHIP IS NOW READY!

Build and FLY the ROCKET SHIP! No propeller, no rubber bands, no motor, but—a REAL ROCKET! New in design, new in principle, years ahead! Fascinating to build—Thrilling to fly—Safe to operate! It takes your breath away with REAL SPEED! Up, up, into the air, faster than any model has ever flown before! You've read about them, now be first to build and FLY one! Learn the principles of the ROCKET SHIP, the plane of the future! The price—lower than ordinary 2-ft. kits—Everything you'll need, even the rocket, rushed Express-paid for ONLY $2.00! C.O.D., if you wish.

ROCKETCRAFT, Rm. 502, 1250 Fullerton Ave., Chicago, Ill.

FLY-WEIGHTING!

Now every model you build, whether flying, solid or boat, can be lighter, neater, and win awards! The time and money-saving SPECIAL BALSA-SANDER makes lighter, better-flying models that look like the pictures, without slow, uncertain hand-sanding. Use hand or motor power; adjustable sanding. Improve your next model by mailing a dollar NOW (or C.O.D.). Sander rushed post-paid. Only **$1.00** complete Postpaid.

SKILLKRAFT, Rm. 402, 2409 Surrey Ct., Chicago, Ill.

exclusively for intended purposes; i.e., that which pertains to the objects of the club.

Dues:

Members of this club must pay dues of 15 cents per month.

Dues may be paid monthly or in advance.

Any time any member lets his dues become one month in arrears, he is automatically dropped from the club.

The money collected for dues may be used only as the majority vote of the club directs.

No dues will be returned to members who are expelled or who resign.

General:

Any part of these by-laws may be changed or additions made by a two-thirds majority vote.

All the business of this club must have the sanction of the faculty advisor.

License registration cards for your ships are ready. We wish to have every model in the I.G.M.A.A. licensed at no cost to you. Write immediately for your number. Ships without license numbers will not be allowed to compete in the October 10th contest. A different number for every model you own.

I.G.M.A.A. Contest—October 10th

Rules and entry blanks for the October 10th contest are now ready. Included on the blanks this time is a space where you will enter the motor number of every model you use in the meet. Numbers will be checked before each flight. Start patching your models now and test fly them long before the contest since flying a model for the first time at a contest is becoming rather old fashioned and does not show practicability in the builder. The largest turnout of any meet is expected and competition for the duration and consistency trophies will be keen. Models without I.G.M.A.A. license numbers will not be accepted for this meet so write for your license application blank now. Following are the rules. Study them carefully. The meet will be directed by Mr. Nathan Polk, Field Director of the I.G.M.A.A. under the supervision of Mr. C. H. Grant, Director.

The rules which follow are those drawn up by the International Gas Model Airplane Association. All points not covered by these rules are to be translated according to National Aeronautic Association rules and specifications:

1. A model shall be limited to a maximum weight of 7 pounds.

2. All models shall be of the fuselage classification as established by the National Aeronautic Association and shall conform to the proportions established by N.A.A. rules. The maximum fuselage cross section shall not be less than L2/100 where (L) is the overall length of the airplane.

3. The amount of fuel that may be used for an official flight shall not be more than (liquid measure 1/16 oz. per pound of weight of the airplane.

4. No flight shall be classified as official in which the airplane does not take off the ground under its own power without pushing. The plane may be guided by one attendant throught contact with ONE WING TIP. Such action will not be termed "pushing."

5. Flights may be termed "official" only when recorded by a stop-watch by an official of the contest.

6. All officials must be approved members in good standing of the I.G.M.A.A.

7. All assistants to contestants are required to be members in good standing of the I.G.M.A.A.

8. A flight may not be termed "official" when made by a contestant who is assisted in the preparation for flight by one who is not a member of the I.G.M.A.A.

9. A model is eligible for entry in the contest only when it has been built by the contestant who flies it.

10. Models built by two or more contestants may be entered "under a team" contestant classification.

11. Each contestant may be allowed a total of three official flights.

12. A flight is a start that lasts twenty seconds or more. Any flight less than this time or a failure to fly promptly shall be judged a delayed flight. Three successive delayed flights shall be considered as displacing one official flight.

13. Three official flights must be made to be eligible for consistency prizes. Prizes will be awarded on the basis of total time of three official flights.

Notice

The I.G.M.A.A. gas job registration blanks are now ready and they will be sent to all members who write in for them. If you wish to register more than one model, let us know the number of blanks that you wish. A blank should be made out for each model to be registered.

GAS model builders who have not joined the I.G.M.A.A. as yet are urged to do so at once. The organization has no dues, its sole purpose is to bring together all the builders so that they may exchange their ideas and to keep in detail a record of the advancement of this hobby and to promote its growth. We feel proud of the fact that we have helped to unite more than one thousand builders in the very short time of five months. Send your membership application at once.

SENSATIONAL PERFORMANCE— THE NEW DOUGLAS-DESIGNED "AERO-GLIDE"

ESPECIALLY designed for our NEW AUTOMATIC FOLDING PROPELLER. By adjusting the wing the model will climb to an altitude of several hundred feet. When the model is at the height of its climb and the rubber motor is unwound, the propeller blades AUTOMATICALLY fold tight to the nose of the fuselage shifting the weight, giving the model perfect balance, and at the same time ELIMINATES WIND RESISTANCE. This allows the model to soar and glide like a real glider and does not stall or dive. To describe the beautiful flights made by this model, just imagine a large bird with a wingspan of 41" floating and gliding through the air. A most thrilling sight and one you won't forget. ORDER YOUR KIT TODAY and be the first to build this unusual model. **This model has made flights up to 18 minutes and is capable of doubling this time under favorable weather conditions.**

Douglas Kruse, who holds both the indoor and outdoor championship of the Pacific Northwest, designed the "Aero-Glide" for model contests, and we are proud to be able to offer you this model with such remarkably advanced features.

PATS. PENDING ON AUTOMATIC PROPELLER

Wingspan 41" length 30". Wt. 3 oz. Kit contains all parts to assemble folding propeller—Mamco ball bearing propeller shaft—M & M model wheels—special brown contest rubber motor—glue, dope, tissue, wing ribs and other parts printed "on AAA" sheet balsa—all strips cut to size—full size detail 3-view drawing. This kit contains more than enough materials to build the model, and you will be more than pleased when you see the contents of this wonder kit.

"Aero-Glide" Kit complete $2.50 Postpaid, U.S. and Can.

Send for 1936 Catalogue of gas model supplies and everything to build rubber powered models. Complete line of M & M Model Wheels.

Send Money Orders or CASH only. When sending cash fasten coin to letter with adhesive tape. If located in Washington add State Tax.

DOUGLAS MODEL AIRCRAFT CO.
1400 North 45th St., Dept. C, Seattle, Wash., U.S.A.

Air Ways—Here and There

(Continued from page 27)

picture we were undecided as to whether to list this an "airplane" or a breed of fish. We were informed finally that this is a snapshot of a model, "Miss Miami," built by William Heermance of 14 McAllister Arcade, Miami, Florida. The fuselage is covered with sheet balsa and the wings with tissue as well as the tail surfaces. It has a very long prop, movable controls, shock absorbing landing gear and tail wheel. The span is 22½", overall length 20½". This job flies exceptionally fine.

Here we have something different. It is a work of art not only from a construction standpoint but from a photographic one. Picture No. 7 shows a close-up detail view of a section of a scale model fuselage. You will note that the workmanship on the model itself is flawless. Those who have taken many photographs also realize that it is a difficult problem to get such a close-up shot of the fuselage as shown here. Mr. Bert A. Sloane of 161 West 75th Street, New York City, is the talented craftsman. He says:

"The picture represents the unfinished cockpit of an unfinished flying scale Boeing '95', which has a wing span of 36".

We hope Mr. Sloane will favor us with a picture of the whole ship complete.

As usual our trick photographer is with us this month. He is J. H. Livingston 3rd of 2127 Mount Holly Street, Baltimore, Maryland, this time. He sends us picture No. 8 which shows the first model that he ever built. It was built to plans of his own design and it won a prize of $50 at the Maryland Institute in 1932. The wings and struts are made of white pine cut out by hand, the wires are streamlined and the instruments on the panel are covered with glass. Upon close inspection of the picture, one can hardly realize that this is not a large ship as it stands in the middle of a field with a background of trees.

Mr. Donald R. Towne of 7 May Street, Bay Shore, New York, sends us a picture of the speed ship which he recently built but which we regret is not clear enough to print. However, he tells us something about it. He says that he entered it in a contest sponsored by the Islip Chamber of Commerce at Islip, New York. He attained first place in the fifty yard free for all speed event. The distance was negotiated in a time of 2 1/5 seconds.

We hope Mr. Towne will favor us with a better picture which we can print for our readers.

Mr. Richard Miller of 1656 S.W. 15th Street, Chicago, Illinois, replies to Mr. Lloyd Gabriel's remarks concerning the number of winds he can get in rubber motors. Mr. Miller writes:

"Mr. Gabriel says you cannot get 600 to 800 turns in an eight strand motor of a two foot job and 500 turns in a four strand motor of a two foot job. I disagree with Mr. Gabriel. I have an eight strand motor in my two foot job and I got 600 turns in a stretched lubricated motor. I also have a four strand motor stretched and lubricated in a two foot job in which I put 650 turns. I can put more in if I want to."

As usual it appears that results obtained from rubber motors vary within large limits. The whole essence of the problem is that these tests are made with different types of rubber under different conditions. When comparing the test of one motor with another, the greatest of care should be used to ascertain that the variable factors in both cases are similar. Some of the factors which affect rubber motors are heat, intensity of light, whether the rubber is lubricated or not, how much it is stretched, how many times it has been wound previously to the test, the type of rubber, size of the rubber and its quality. The latter cannot be determined accurately as this varies under certain conditions of manufacture. So you see that after all, comparing one rubber with another is very similar to putting together a Chinese puzzle. They can be compared in a general way only.

MODEL NEWS FROM OTHER COUNTRIES

England

As readers of last month's issue remember, England took home the Wakefield Trophy. To show the type of models and the excellent workmanship which it embodies we refer you to picture No. 9. This is a picture of a contest model sent to us by Len Scott of 7 Portland Place, Halifax, Yorkshire, England. He is one of the foremost English model builders. The model has a 52" wing span with a tapered wing and a box spar is used to support the R.A.F. 32 airfoil section of 200 square inches. The motor is a twin skein job, geared up two to one. The balsa wheels are hollowed and the undercarriage struts are well streamlined. The total weight is five ounces. Mr. Scott writes us as follows:

"My Wakefield cup entry, though not successful in London, made a record flight the Sunday after by flying over ten miles and remaining aloft over an hour.

"The main object of this letter is something for which I shall be very grateful if you can manage it for me, and that is to find a suitable model enthusiast with whom I can correspond and exchange ideas."

Here is a chance for some readers who wish to become better acquainted with our model building friends in England.

Netherland East Indies

The model building craze is apparently not confining itself to the well-known places in the world, for we hear from J. S. A. Sigmond of Petjenongan 82 pav., Batavia-C, Netherland East Indies. He sends us picture No. 10 of his glider in full flight. It is one of the best pictures of this type we have received. The crowds can be clearly seen in the background. However, we will let him tell you of his model career as he writes it in his letter to us. It is as follows:

"I am a model airplane fan. Eating, sleeping and living it for about three years. Until two months ago I was alone, absolutely alone in this field in Batavia. Then I met two companions fanatical in model building.

"It is a pity that I can send you only one picture. It is of a glider at an altitude of about 40 meters (about 120 feet); and has a span of 120 centimeters (48") and weighs only 20 grams (¾ oz.). As for its dimensions, it is rather heavy and has made

Win a Free Trip to Europe on the

QUEEN MARY

Also 28 Cash Prizes—Medals—Cups for Boys Who Build this 18 in. Ship Model!

Wouldn't you like a Free Trip to Europe and Return on the new Cunard White-Star Superliner—or could you use $50 Cash Money? These are some of the Prizes in the IDEAL Model Ship Building Contest. Get the IDEAL Official Contest Kit containing a fully finished "Redi-Form" Hollow Hull and all Parts, Material, Plans and Instructions to build and decorate your Model. It's easy; anyone can do it; full details and Contest Entry Blank in every kit.

Complete Contest Kit ..... **$1** Plus 10c postage

Ask your dealer, or Order Direct.

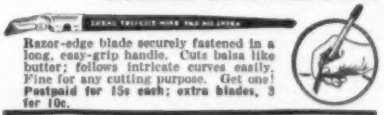
1/32 in. DeLuxe Scale Models

R.M.S. QUEEN MARY—31½ in. long.....
S.S. NORMANDIE—32½ in. long..... **$5**
Italian Liner REX—29 in. long.....

Each Postpaid (West of Denver, add 50c extra)

Beautiful Models, in perfect scale, wonderfully decorated. Kits contain shaped wood hulls, turned wood parts, printed wood decks, and superstructure; cast metal life boats, winches, stairways, etc.; cement, lacquer and everything else required to complete the Model, including Plans, Photos and Instructions. Complete Kits for QUEEN MARY, NORMANDIE or Rex, Each $5.00.

Try This New IDEAL Tru-Cut Nife



Razor-edge blade securely fastened in a long, easy-grip handle. Cuts balsa like butter; follows intricate curves easily. Fine for any cutting purpose. Get one! Postpaid for 15c each; extra blades, 3 for 10c.

Sensational Ready-to-Fly

Mickey Mouse Airplane

Not a Construction Kit

A tough, durable, featherweight flying airplane that flies 100 to 200 feet. Needs no construction. 16½ in. Wingspan, 12 in. Long, weighs 1 3/16 oz. Get one and have some fun. Sent postpaid for only..... **75c**

DeLuxe Model; extra Wing and two rubber motors, Postpaid for $1.00.

Something New!!

Powdered Wood Filler

A new material that works wonders! Mixed with water, this material is excellent for filling porous balsa surfaces, holes, cracks, etc. When applied to any rough wood surface with a cloth, then sandpapered, it leaves a smooth, even finish that improves the lustre of lacquer, enamel and other finishes. 1 oz. Envelope (Sufficient to cover 200 sq. in. of flat surface) sent postpaid for only..... 15c

Illustrated Catalog—Bulletins

Beautifully illustrated Bulletins of Model Ships and Airplanes, with Lists of Boat and Airplane Parts, Supplies and Materials—all for only 5c.

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IDEAL AEROPLANE & SUPPLY CO., INC.

20-24 W. 19th St., New York City.

Please send me the items checked below. I am enclosing.....(All Canadian Prices 40% higher)

18 in. QUEEN MARY Contest Kit ☐ $1.10
31½ in. DeLuxe QUEEN MARY Kit ☐ 5.00
32½ in. DeLuxe NORMANDIE Kit ☐ 5.00
29 in. Liner REX Kit ☐ 5.00
Tru-Cut Nife ☐ 15c Powdered Wood Filler ☐ 15c
Mickey Mouse Airplane ☐ 75c ☐ $1.00

Please print name.....

Address .....

City..... State.....

only flights of about 1,000 feet in distance. I used the material of which I send you two samples. It is lighter than balsa, but not so breakable and is very easy to handle.

"A paper thin sheet may be obtained merely with a table knife. Certainly this material can also be obtained in America, in the tropics of course. It is a sort of palm tree but without a trunk. It usually grows on watery grounds such as swamps or places near rice fields."

We regret that we cannot put in the magazine a sample of the material to which Mr. Sigmond refers. We wish to say that it is all that he represents, being exceedingly strong and lighter than balsa wood. The strength is due to thin fibres of a tough material passing through the wood. In structure it is similar to reinforced concrete, in which each inforcement passes through it. We assure you, however, that it is not similar in weight. If any readers know of this material and can tell us where to obtain it in this country, we would appreciate hearing from them.

CHAMPIONS

FOR REAL FLIGHTS

CADET MAJOR—CADET Jr.,

Span 30" Area 102 Sq. In. — Span 20" Area 45 Sq. In.

Here are the two greatest performers ever designed for Model Builders. Thousands have been sold and from everywhere come enthusiastic reports on their Prize Winning flights.

Why experiment with unproven models when the Cadet Major and Junior guarantee you Championship performance.

Why jeopardize your chances of winning . . . when these famous models have so many wins to their credit. *Line up with a champion! Fly a Champion! Win with a Champion! Order your Cadet Major or Junior today.*

CADET MAJOR Kit — Postpaid $1.50
CADET Jr., Kit — 50c Plus 10c Postage
Both Kits, Postpaid — $2.00

Send 3c stamp for Catalogue

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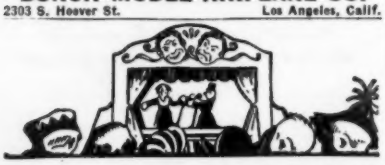

Make a PUPPET SHOW For YOUR HOME

Send for Your Copy of the 32-page Booklet Telling the Easy Way

This 32-page booklet tells in easy-to-understand language—with plenty of pictures—just how to plan, make and operate fascinating and entertaining hand and string puppet shows. Tells how to make puppets, the furniture, the setting, the stage, etc. Grown-ups as well as young people are making puppet shows for the home, club, school, church. Now you can make puppets of your friends and give a performance with them as characters. It is so easy and lots of fun. Get your copy of the complete Puppet book at this special offer — a regular 50c book for only 10c, the actual cost of mailing and handling. Write for your copy.

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Enclosed you will find 10c in
☐ Stamps ☐ Coin
Kindly send your 32-page illustrated and descriptive booklet, "How to Make and Operate a Puppet Show."
Name.....
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Australia

Picture No. 11 shows a tri-motor model of the "Southern Cross" built by Ken. Moore of the Model Flying Club of Australia. All three props are driven from one motor. The machine flies exceedingly well.

Following is an account of some of the contest activities of the Model Flying Club which appeared in one of the newspapers in Australia recently.

A model plane, brought from Brisbane in the Stinson air-liner, was second in the 1936 Wakefield finals, at Maroubra yesterday, but in winning the following event was lost forever to aviation.

In this event, for the Anthony Hordern trophy, after 14 min. 47 sec., the model was lost to sight and posted missing far out in the Pacific.

Results:

1936 Wakefield Finals.—E. E. Luke (average 1 min., 35 sec.), 1; F. Miller (avg. 46 sec.), 2.

Wakefield Heat for 1937.—J. Brown, Albury (avg. 3 min., 51 sec.), 1; J. Allcroft, Gosford, (avg. 1 min., 37 sec.), 2; R. Gorrel, Kensington (avg. 1 min., 29 sec.), 3. The winner receives the Australian Broadcasting Commission Medal.

Angus and Coote Cup.—H. Phipps, South Australia (6 min. 28 sec.), 1; J. Brown, Albury (4 min., 4 sec.), 2; Claude Greentree, Wilberforce (3 min., 15 sec.), 3. The winner receives a miniature cup.

Anthony Hordern Trophy.—F. Miller, Queensland (14 min., 47 sec.), 1; R. Holmes, Kensington (2 min., 37 sec.), 2; Clifford Greentree, Wilberforce (2 min., 29 sec.), 3. The winner receives the Air Centre Medal.

A model plane exhibition was held recently, from the 26th of August to the 2nd of September, under the auspices of The Australian Flying Corps Association and the Model Flying Club of Australia. The classes of models entered were solid scale, flying scale, fuselage models, models showing structural work (skeleton), Wakefield types, giant models with a minimum span of 48" and gasoline-powered models. Winners of the various events were given cash prizes of approximately $5. The first prize in the gas model event was a Texaco motor. The list of events shows the scope of model activity in this country on the other side of the globe.

Word comes from E. Georgeson, Hon. Secretary of the Model Aeroplane Association of Australia, of 84 Irish Harp Road, Prospect, South Australia. He tells us that a big flying contest will be held in connection with the South Australian Centenary celebrations in November. Mr. Georgeson writes us as follows:

"The events include petrol and compressed air-driven models, rubber-driven (including Wakefield models), gliders and sailplanes. In order to make a success of these events on this occasion, we are sending you an invitation to participate. If you are in a position which makes it possible to attend personally, you are doubly welcome and we will billet you at our own expense. If this arrangement should be impossible would you be good enough to send us as many representative models as you can? I can assure you that any such models will be cared for and flown by our leading members and any prizes won will be promptly forwarded. The trophies and cash prizes will certainly be worth the effort.

"We are looking forward to your co-operation and any suggestions you may make will be appreciated. If it is not asking too much, would you kindly pass this letter on to anyone who you think might be interested in it or publish it in your magazine."

France

Picture No. 12 shows a group of enthusiastic model builders of France. It was sent to us through the courtesy of Mr. Ed. Jarland of the Ligue Aeronautique De France of 18 Avenue Victor Emmanuel III, Paris, France. Mr. Jarland has been kind enough to send us a resumé of model activities in France. However, it is of such length that we will be unable to print it here. We are sure that he will be glad to supply any information that readers may wish concerning French model aviation if they will write to him.

Sweden

In the past we have had very little news from Sweden. However, Mr. Hans Lemjlwortt of "Eskader", Narvapalatset, Gumshornsgatan 8-9, Stockholm, Sweden, sends us picture No. 13 which shows a group of builders in a workshop in Stockholm where they are making an intensive study of model design and construction. They have had considerable experience with American models and like them very much, he tells us.

Holland

Mr. William Ying has been kind enough to send us a picture of a group of builders in a workshop in Amsterdam, Holland. It is picture No. 14. He has been corresponding with some of the builders, we understand. The picture was sent to him by Steven Gerret van der Keeft and Henrick de Keijserplein.

CLUB NEWS

Wisconsin

We hear from Harold G. Sinsburg, Advisor of the Hawks Model Club of 2123 North Farwell Avenue, Milwaukee, Wisconsin. He tells us that they have a very live club there of eighteen members up to twenty years of age. He says:

"They meet every Friday night at my shop and go in for models of all types, as well as aerodynamics and advanced technical subjects. Their work is recognized as the most detailed and accurately finished of any club in this state. Regular displays of their models take place at the hobby shows and other exhibitions scheduled during each year.

"This club is a difficult club to break into because of the strict building ability, aviation knowledge and good sportsman-

ship required. This has kept it at a very high standard."

New York

Mr. Douglas Jade, President of the Huntington High School Model Airplane Club of Huntington, New York, tells us that they are to have a contest at Huntington on the 10th of October. There are to be both scale and flying events. The contest is limited to high school students of Long Island only. Those who are interested should write Mr. Jade at Woodbury Avenue, Huntington, New York, for further information.

Massachusetts

Here is some news that will be of interest. Recently Mr. B. Hall has been appointed director of the Jordan Marsh-Boston Traveler Junior Aviation League. He expects to carry on the extensive activities of this club in the future, as in the past.

Missouri

A very interesting club paper, "The Aeronautical Reporter," is to be put out by the Stix, Baer & Fuller Model Airplane Club. In it is given news of the various club activities. At the time you read this the popular Mississippi Valley Model Airplane Tournament will have taken place. We regret that news of this event did not come to us in time for proper announcement. Any news concerning the activities of the club may be had by writing to the Stix, Baer & Fuller Model Airplane Club, St. Louis, Missouri.

A junior world's record for tow line gliders came to Boston with the running off of the first summer time outdoor contest by the Jordan Marsh-Boston Traveler Junior Aviation League.

Ralph Brown, 14, of Arlington, Mass., flew his Class C tow line glider for 9:32.0 in the meet held at Smith Playground, Allston, from 10 A.M. to 2 P.M. Other winning places went to Frank Barrett, Jr., of Brighton in the stick type hand-launched event and in the fuselage R.O.G. competition.

The aim of the contestants at this first in the series of outdoor summer contests sponsored by the Jordan-Traveler organization was the splendid Frederick L. Ames Memorial Trophy which will be awarded at the end of the summer to the boy or girl making the longest flight with any type of outdoor craft.

A summary of the winners is as follows:

Gliders:

1) Ralph Brown Tow Line Class C....9:32.0
2) Hewitt Phillips Tow Line..... :38
3) Leslie Woodman Hand Launched.. :35.2

Stick Type Hand Launched:

1) Frank Barrett, Jr., Class C.....4:30
2) Robert Shea Class C.....1:50.8
3) Sidney Wallerstein Class C.....1:45

Fuselage R.O.G.:

1) Frank Barrett, Jr., Class C.....2:52
2) Robert Shea Class C.....2:10
3) Morris Sulkin Class C.....2:03

The meet was officially sanctioned by the National Aeronautic Association and was under the direction of League Director G. Bancroft Hall.

Unscheduled thrilling flights were provided by Jack Golden flying a scale Monocoupe and Everett Tasker stunt flying a twin pusher entry.

New Jersey

Dunellen, New Jersey, now has a model aero club. J. E. Kelley, president of the club, with headquarters at 306 Mount View Terrace, Dunellen, New Jersey, writes and says:

"Our club is entering its second year of existence. The Club receives your magazine and we find it very satisfactory.

"We have an enrollment of twenty-three members. We have had several successful contests. The club is now preparing to enter a contest given by the Efinger Sport Store in Bound Brook, and we hope to win as many events as we did last year.

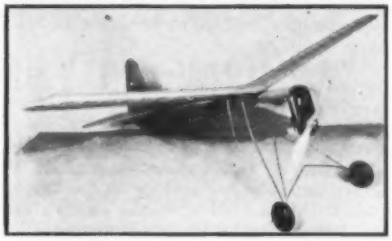
"Most of the members have been building flying and scale models. We are planning, in the near future, to build a 'Flying Flea' light plane. Financial difficulties are stopping our building it at present."

Illinois

From Chicago, Illinois, word of the "Aeronuts Bulletin" comes to us. This is a new publication which is being edited by J. Jenkins of 1208 Foster Avenue. The secretary is T. Cunningham of 1039 Hollywood Avenue. Both these gentlemen are residents of Chicago.

We cannot help but sense the spirit of Carl Goldberg permeating somewhere in the vicinity of the editorial offices.

AMERICA'S FINEST GAS MODELS



$4.85 The Scout $7.25

A good rough weather flyer. When others have to put their ships away because of wind your SCOUT is flying at its best. Designed for the 1936 Cyclone. The spectacular climb of this ship makes it the main attraction wherever flown. Plans show two wings, regular 54" and the 48" speed wing. Kit with bamboo paper and Sponge rubber wheels $4.85 plus 50c postage. With silk and air wheels $7.25 plus 50c postage.

The CORBEN
Wing Span 70 Inches

432 flights on one ship without a crack up. Engineering? The best. Flying ability? In a recent contest CORBENS took second, third, and fourth. Rated AMERICA'S NUMBER 1 service model. We couldn't improve the ship so we improved the kit. Besides having silk, air wheels and a finished prop, we have added colors, thinner, wire and switch. Nothing more to buy but your engine and batteries. Cyclone, Brown or any similar engine may be used. Kit $12.75 plus 50c postage.

GAS MODEL SUPPLIES

14" Brown, 13" Cyclone pine props $1.25 Hardwood props $1.50. Spark plugs 75c, 3½" air wheels $1.25 pr. Best silk 50c yd. 3/32" & ⅛" O.D. Straight Music wire, aluminum sheet and tube, dural wire, No. 70 oil Cyclone parts, Special 17 amp. 3.2 volt, 4½ oz. batteries $1.00. Gas model, dope and cement. Switches 20c. Unvarnished hardwood props, 13" or 14" $1.00. Write for list.

CYCLONE ENGINES AND PARTS IN STOCK FOR IMMEDIATE DELIVERY. DEALERS: LIBERAL DISCOUNT ON ONE KIT OR MOTOR. We have a complete line of model supplies, also kits priced from 10c up. 71 kits in the MODELCRAFT and Pacific line. Fastest selling kits and supplies because we have what the largest number of builders want, that's why

MODELCRAFT

2125 W. 54 St., LOS ANGELES, CALIF.
is the Leading Model Supply House of the West

A Combination Offer That Will Amaze You:—ALL FOR $2

12 Issues—1 YEAR of MODEL AIRPLANE NEWS plus 24 Issues—2 YEARS of OPEN ROAD FOR BOYS

BOYS! You won't be able to match this offer anywhere, any time. Here are 2 outstanding magazines—both of which are well worth twice their regular newsstand prices per copy. MODEL AIRPLANE NEWS is 20c per copy; OPEN ROAD FOR BOYS is 10c per copy. This combination offer brings you 36 magazines at a total value of $4.80. Think of it! This offer saves you $2.80 on the transaction. Don't pass it up! Fill in the coupon now. You'll be mighty glad you did it.

MODEL AIRPLANE NEWS, MAN
551 Fifth Avenue, N. Y. C.

I want the next 12 issues of Model Airplane News and the next 24 issues of Open Road for Boys, beginning with current issues. $2.00 enclosed, covers payment of all 36 issues.

Name.....

Address.....

City..... State.....

It is an exceedingly fine little sheet and contains some interesting news, as you might imagine, on high performance models.

Notices of Contests

MODEL AIRPLANE NEWS will be glad to print the news of various model clubs throughout the country if these clubs will send copy in to the magazine six weeks before the magazine appears on the newsstands. Our magazine usually appears on the 10th of the month preceding the date of issue. For instance, the September issue appears on the newsstand August 10th. Copy for this issue should have been in by July 1st.

Air Ways Club News

The Air Ways Club is now growing to very large proportions, reaching the thousand mark.

Unquestionably many of our readers will want to know more details of the Air Ways Club. This organization is an association of model builders and model building clubs who have for their object the advancement of model aviation and the increase of knowledge concerning all phases of this constructive sport and hobby. Their purpose also is to develop and pass on to other club members new ideas and information concerning model design, building and flying, in order that through this activity, they may attain a complete knowledge of things aeronautical, and thereby fit themselves for a career in aviation and help their country in this great field of transportation.

Who May Belong

Any model builder who is sincerely interested in model planes may belong to this club, either as an individual or as a member of a unit. A unit of the Air Ways club may be any club which is already formed and operating, or any group of model builders may get together and form a unit if the number of members in the unit is five or more. There are no special dues, rules or laws which units or members must follow. The Air Ways club is merely an association of clubs. Any club or unit may operate under its own laws and dictates, holding its meetings and continuing its activities as it sees fit. However, the association reserves the right to expel any club who is not a credit to the association in respect to its behavior and in the manner in which it carries on its activities.

It will interest club members to know that the Air Ways Club is establishing a beautiful silver trophy for the greatest flight duration for all rubber-powered models, irrespective of model type. This trophy will go to the Air Ways Club member establishing the greatest duration under the National Aeronautic Association rules after September 1st, 1936.

The winning flight must be made at a contest sponsored by the National Aeronautic Association.

All model clubs who are not units of the Air Ways Club are invited to join, also any individual model flier who is interested in this art. All that is necessary is to write in for an application blank or fill in the application which appears at the bottom of this column. It is desired by the Air Ways Club to make this organization one big brotherhood. News of interesting activities will be published in the Air Ways columns in future issues of MODEL AIRPLANE NEWS. Join Now.

APPLICATION FOR MEMBERSHIP IN THE AIR WAYS CLUB

Please enroll:

Name .....

Address .....

Number of Models Built .....

Type .....

Date .....

Aviation Advisory Board

(Continued from page 30)

wing center section. The front end of the stick will be considerably below the thrust line of the front wing. Try this out in diagram form on a piece of paper and you will get the idea. In the near future plans for a twin pusher of this type will be published in MODEL AIRPLANE NEWS.

Question: Is an aspect ratio of seven too much for a twin pusher?

Answer: No, aspect ratios of eight to ten are sometimes used. The U.S.A. 27 wing section is a good section for a twin pusher.

Question: What per cent of the wing area should the diameter and blade area be for the propeller of a gas model?

Answer: In cases of planes which use a power unit whose power is predetermined and constant without the possibility of its being varied, the characteristics of the propeller cannot be figured as on rubber-powered models. In designing your propeller there are two variables which determine its general characteristics of design; the angle of climb and the power applied.

In rubber-powered models, the angle of climb desired is assumed as constant, which means that your propeller may be designed for this characteristic regardless of the power it may absorb in order to accomplish it. Thus, when you design the motor, you merely add sufficient strands of rubber to give the power necessary to develop the full efficiency of the propeller and the desired angle of climb.

On a gas job, by necessity, the power instead of the angle of climb is the constant. Thus the propeller must be designed to absorb a given amount of power. This means that if little power is available, the angle of climb will be smaller. In effect it is proportional to the power.

In designing your propeller, the first thing that must be considered is the number of revolutions the engine makes when operating most efficiently. Your propeller must be designed so as to have the engine turn when in flight, this number of revolutions. Next the speed of the airplane is figured in feet per second. This is done through knowing the weight and the lifting capacity of the airfoil in normal flight. Next the speed of the airplane in feet is divided by the number of revolutions the engine makes. This will give you the distance the plane travels forward in one revolution, or the actual pitch of the propeller. The propellers should be made so that the blades travel at an angle of attack when revolving.

This angle of attack should be such that the actual pitch is twenty-five per cent less than the theoretical pitch. In other words, the propeller slips twenty-five per cent. If your actual pitch is nine inches your propeller should be laid out and carved with a theoretical pitch of twelve inches.

Now we come to the point of area. The velocity with which the propeller turns is determined by this fact. Neither the diameter nor the pitch should be changed for any given machine when the engine does not revolve with sufficient speed. In such a case the area of the blade should be cut down in order to allow the propeller to spin faster. Of course, this will cut down the angle of climb. The only way to increase the angle of climb is to install a more powerful engine, which will then allow you to increase the blade area of your propeller.

Watch for the Results of Air Way's Design Contest in the NOVEMBER Issue. New Contest Starts!

CLASSIFIED DIRECTORY

Advertise in this directory for quick profitable results! Rate 10c per word. Minimum 20 words. REMITTANCES MUST ACCOMPANY ALL ADS FOR THIS DIRECTORY. Advertisements for the November issue must be in by September 10th.

MODEL AIRPLANES—KITS—MODELS—SUPPLIES

FLYING ROG's that are different. Racy designs in easy-to-build kits. Models from 28" wingspan with consistent 1500 foot flights—to 8½" wingspan with 200 foot flights. Priced 50c down to 10c. Builders—catalogue and kit specifications Free. Dealers inquire on letterhead. Air-King Model Company, 3262 N.E. Dunckley, Portland, Oregon.

GASOLINE Model Motors, 1/5 h.p. for airplanes, boats. All material, castings, drawings, $5. Complete, $14.75, list 3c. Apex Motors, 443 Berkeley, California.

MODEL Builders-Jersey City, Bayonne, Hoboken and vicinity. Visit Bill's Model Airplane Shop, the largest model plane and boat supply house in Hudson County. Only highest grade balsa and spruce. Gas job supplies. Brown, Cyclone and Forster engines. 447 Jackson Ave., Jersey City, N.J.

MIDGET Gasoline Engine owners—we are distributors of AC Spark Plugs. Fits any standard model engine. Each 75c postpaid. Dealers, write—Bruck Brothers, 1815 Morris Ave., New York City.

U. S. GOVERNMENT tested color dopes for beautiful finish. Only 10 cents ounce postpaid. Minimum order 5 ounces. Carew & Shaw, Seattle, Wash.

FREE Plans for 3 flying models with each order for 26" flying scale Puss Moth. All parts stamped. Flies 1500 feet. Finished propeller, $1.00 postpaid. Crescent, 8642 18th Avenue, Dept. M, Brooklyn, N. Y.

FREE Samples! New. Slip on thrust bearing. Lighter. Stronger. Holds landing gear without gluing. Aluminum. Send now. E. & M. Models, 4802 Clarendon Road, Brooklyn, N. Y. (Handling, 5c.)

RUBBER Thread and rubber bands. Manufactured by Hodgman Rubber Co., 251 Fifth Ave., New York City. Write for samples and quotations on letterhead.

THE K-G Gas Model Ship flies exceptionally well! Send 50c today for 7-view plans, size 22½"x29½". All the information you'll need, including list of materials. Orders receive immediate attention. Model Airplane Bureau, Suite 925-C, 551 Fifth Ave., N.Y.C.

MODELBUILDERS, It's free! Write for our low price lists on supplies. Kansas City Airplanes, 4033 Bellefontaine, Kansas City, Mo.

GIANT models, 4 motor Clipper type Junkers, 34"x18", $2; LZ129 Hindenburg, 38", $2; Liner Bremen, 38", $2.50. Imported, beautifully lithographed on cardboard to cut and glue. New principle model building. Standard Specialty Company, Box 311-M, Gary, Indiana.

DEALERS, Clubs, Schools; Free! Our new larger lower wholesale list. Kits, supplies. Model airplane Utility, 5307 New Utrecht, Brooklyn, N. Y.

MEGOW produces another Leader!

¾ INCH-SCALE FLYING MODEL

$2.00 COMPLETE KIT

The New
AERONCA

The New Aeronca First of a Series of ¾" and ½" scale models. Watch for more "Model-of-the-month" Sensations.

Megow's Big New 20-page Catalog

Contains 100 different models of Airplane and Ship models at prices from 10c to $2.

Send a 3c stamp for it today.

BEGINNING with this new ¾" scale model Megow sets a standard in value, in completeness and in quality that is unequaled today. We do not hesitate to say it is the finest development in scale model building that has been offered to model enthusiasts.

Look What We Have Put in the New ¾" Scale AERONCA KIT

Complete detailed plans and photos of skeleton and finished models. Finished flying prop and blank for scale prop. Over-size quantities of cement, tissue cement and colors. Correct colors in paper. Shaped wheels. Aluminum drag ring. Heavy celluloid for cabin windows. Movable controls on tail and wings. All insignia. Description and material to complete cockpit including blocks to make pilot's figure.

A WONDERFUL LINE OF FLYING MODELS

25c EACH

WACO CUSTOM

A very popular model is this 5-place biplane cabin job. It is the outstanding cabin biplane of the whole country. This kit contains the Megow ready turned cowling.

STINSON RELIANT

As you can see by the photograph, our new model of the Stinson is very realistic indeed. It is a worthy addition to our famous flying line. This kit contains the Megow ready turned cowling.

TURNED NOSE

ready to fit included in Waco, Stinson, and Kinner kits. (Not included with Taylor Cub).

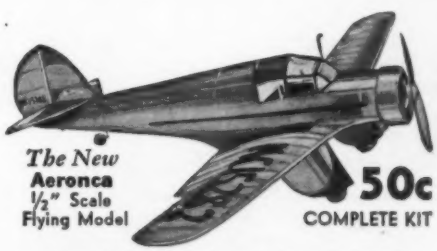
KINNER SPORTSTER

A popular two-place, side-by-side, low wing sport job. Remarkably complete, yet light in construction. It performs just as good as the other 24" models. This kit contains the Megow ready turned cowling.

TAYLOR CUB

A remarkable model of a well-known sport job, the Cub is also a very stable flyer. Like our other models, it is built to scale from original plans of the real ship.

Add postage: 10 cts. east or 15 cts. west of Mississippi River.



The New
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½" Scale
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COMPLETE KIT

An exact replica of the larger kit. Containing all liquids, aluminum drag ring and shaped wheels. Complete supply of all material and detailed plans.

Ask Your Dealer

Get your new ¾" or ½" scale flying models from your dealer and save postage. If there is no Megow dealer in your community, send us your order and add postage as follows:

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The 20" Flying Models That Can't Be Duplicate Anywhere Else—Even At Twice The Pric

Nothing in years has caught modelbuilders' fancy so quickly or completely as these spectacular C-D REP (Representative-Duration) 20" flying models. Bargain buys in the full sense of the word, for builders themselves state that C-D REPS are better than many models that cost two or three times the ridiculously low prices. Every single Kit is genuine C-D quality, and that means the finest possible drawings, materials and supplies (but remember, REPS contain NO LIQUIDS). At these low prices, there's no reason why any modelbuilder can't build the entire group—so don't put off the fun of doing it. Don't delay—get the models you want today—before our quantity is exhausted—if your dealer can't supply you, order direct. Immediate delivery as always—Cleveland's "Lightning Service"!

★ ★ ★ ★ ★

14 Cylinder HUGHES RACER

Silver and blue model of the 350 m.p.h. super-speed flyer—nearest approach yet to a rocket ship. Retractable landing gear. Kit R-54 complete (except liquids) postfree, only **75c**

The More They Build The More They Want To Build

"I have just finished 'Mr. Mulligan' of your new 20" Rep models, and must say that the Kit is simply swell, to say the least. The Kits are worth much more than you charge, and are better than some Kits I have been paying a dollar or more for. I am starting on the 20" Hawk P6-E right now, and as soon as I finish that, I start on the Consolidated and the Fokker D-7. I shall probably build all the models you design in this series, as well as some of your other models." YOUNGSTOWN, OHIO.

HAWKER—LOW WING MERLIN-POWERED FIGHTER

Landing gear may be fully retracted as on the prototype, coloring suggested all silver; insignia supplied. A "peach" for flights. Kit R-57 complete (except liquids) post free only..... **50c**

They're All Raving About This RYAN SPORTSTER ST

This beautiful little two place job is well known to model-builders everywhere and our model looks as pretty as does the prototype. Span of course 20", suggested coloring, all silver, like the prototype. Model stable and fast. Kit R-58 complete (except liquids), postfree, only **50c**

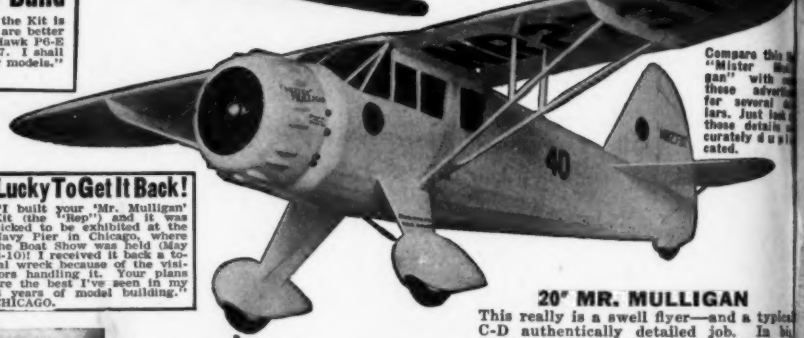
An Amphibian Never Yet Equalled.

CLEVELAND AMPHIBIAN

Will take off water like the real thing. Span 28". Twin motored. Long steady flights. Kit R-X5001, complete (except liquids) only..... **60c**

Lucky To Get It Back!

"I built your 'Mr. Mulligan' Kit (the "Rep") and it was picked to be exhibited at the Navy Pier in Chicago, where the Boat Show was held (May 3-10)! I received it back a total wreck because of the visitors handling it. Your plans are the best I've seen in my 3 years of model building." CHICAGO.



Compare this "Mister Mulligan" with these advertised for several dollars. Just look those details accurately duplicated.

20" MR. MULLIGAN

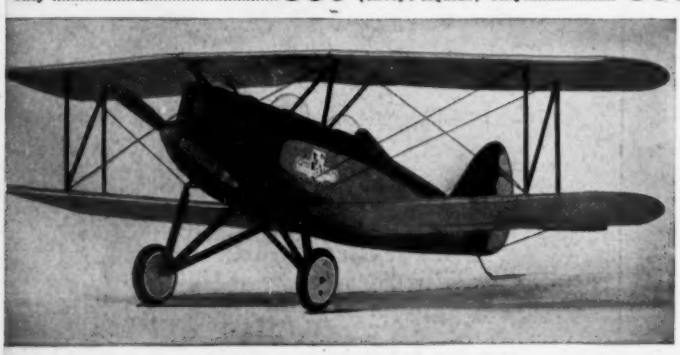
This really is a swell flyer—and a typical C-D authentically detailed job. In big demand—better hurry. Kit R-52, complete (except liquids), postfree, only **50c**

GRUMMAN F2F-1 FIGHTER

Latest Navy fighting ship, still on secret list. Big wing area makes model splendid flyer. Drawings cover both retracted or extended landing gear. Kit R-53, complete (except liquids), postfree, only **50c**

CLEVELAND PIRATE BOMBER

SOLD OUT No further orders for it filled. Rush your order for other Rep kits you want before it is too late.



Compare this with the original $5.50 model; you'll see it's

THE BUY OF A LIFETIME!

GREAT LAKES SPORT TRAINER 2T1-E—This famous design was formerly the flag ship of the C-D fleet—the ship that changed almost every known standard in the model aircraft industry. The kit originally sold for $5.50, and being such an excellent flyer, with so many requests that we bring back this beautiful number, we have done so; and to show the extra quality in the present day C-D designs, this number is now being sold for 50c and is legitimately priced. The model is almost identical with the older design, with but few minor exceptions, and the changes are really improvements, so that you can see that we are selling better models in this low price, light, flying "R-X"-perimental Range at 50c today than we did a few years ago at $5.50—at 1/11th the price! And the old kit didn't even include printed out wood, yet it was a superb bargain at the time (from '29 to '32). This will show our present ¾" scale model value (SF-1 Great Lakes Sport Trainer, Model 2T1-F) even at $2.65 is several times better in general design and a far better bargain than what we sold originally at $5.50. This fine flying model Kit, another experimental "REP" Kit (yes, it's ¾" scale, too—do you want more?), suggested coloring, orange and black. Kit No. R-X5003, complete (except liquids) only..... **50c**

A Great Contest Winner!

CONSOLIDATED A-11 ATTACK

SOLD OUT No further orders for it filled. Rush your order for other Rep kits you want before it is too late.

FOKKER D-7 FIGHTER

This actual 20" model photo is almost a twin to the photo of our ¾" model. Be sure to get it. Kit R-15, excellent flight, complete (except liquids), postfree, only..... **50c**

All C-D 20" Kits Include:

Full size, detailed mechanical drawings—bulkheads, etc., drawn out for repairs. All wood printed out. Finished scale wood wheels. Fine turned cowl front or drilled nose supplied. Fine bearing button. Finished balsa prop. Real model airplane rubber. Real celluloid for windshields. All strip wood of the finest quality accurately cut to size. White Japanese covering tissue. Insignia and wing lettering supplied printed out. Wire, washers, etc., etc.—Absolutely everything needed (even scale prop material, always omitted by others) except the liquids.

Don't Fail to Build This Keen CURTISS HAWK P6-E FIGHTER

Hard to tell this actual 20" model photo from our ¾" model. Full of typical C-D authentic features and details. Speed flights. Kit R-21, complete (except liquids), postfree, only..... **50c**

He Certainly Ought To Know!

"I have been building models for years and have made over 100 various types of planes, and that, of course, would mean that I have had a good many Kits also, but I have never had a Kit as complete, neat, detailed and so low priced as your line of C-D Dwarfs and Reps. I was very much pleased with that 'Mr. Mulligan,' as a matter of fact, I was so overjoyed that I am sending for another Kit, your Fokker D-7 Rep. I have at last found a company with whom I can deal steadily and be sure that I am not taking any chances on a Kit, but am getting the best every time." PORTLAND, MAINE.

CLUBS: Write for Club Notes and discounts—Schools, too!

SEE OUR LARGE AD ON CENTER PAGES

DEALERS: If you want to do a real business on models this Fall—these REPS will blaze the way for you. Every one you sell keeps bustling more business and profits for you. Write immediately for full details.

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